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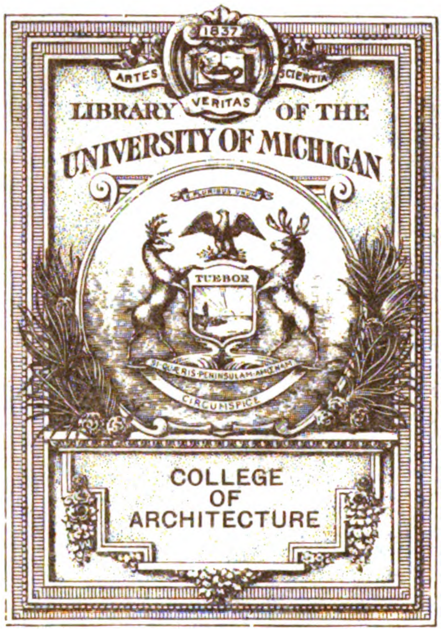

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ARCHITECTURE AND BUILDING

A Magazine
Devoted to Contemporary Architectural Construction

ESTABLISHED 1882

VOL. LII

JANUARY, 1920 - DECEMBER, 1920

New York
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VOL. LII

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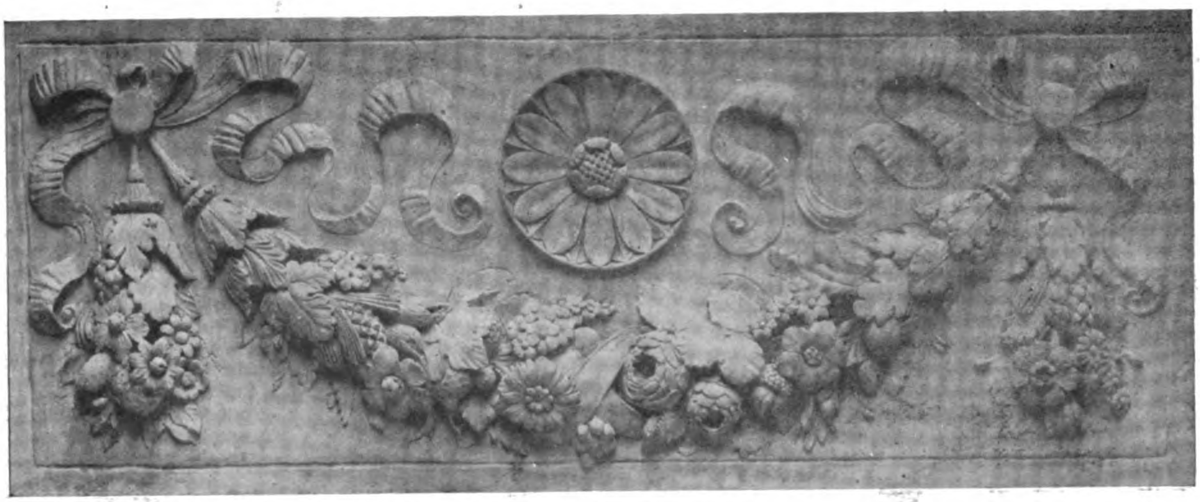

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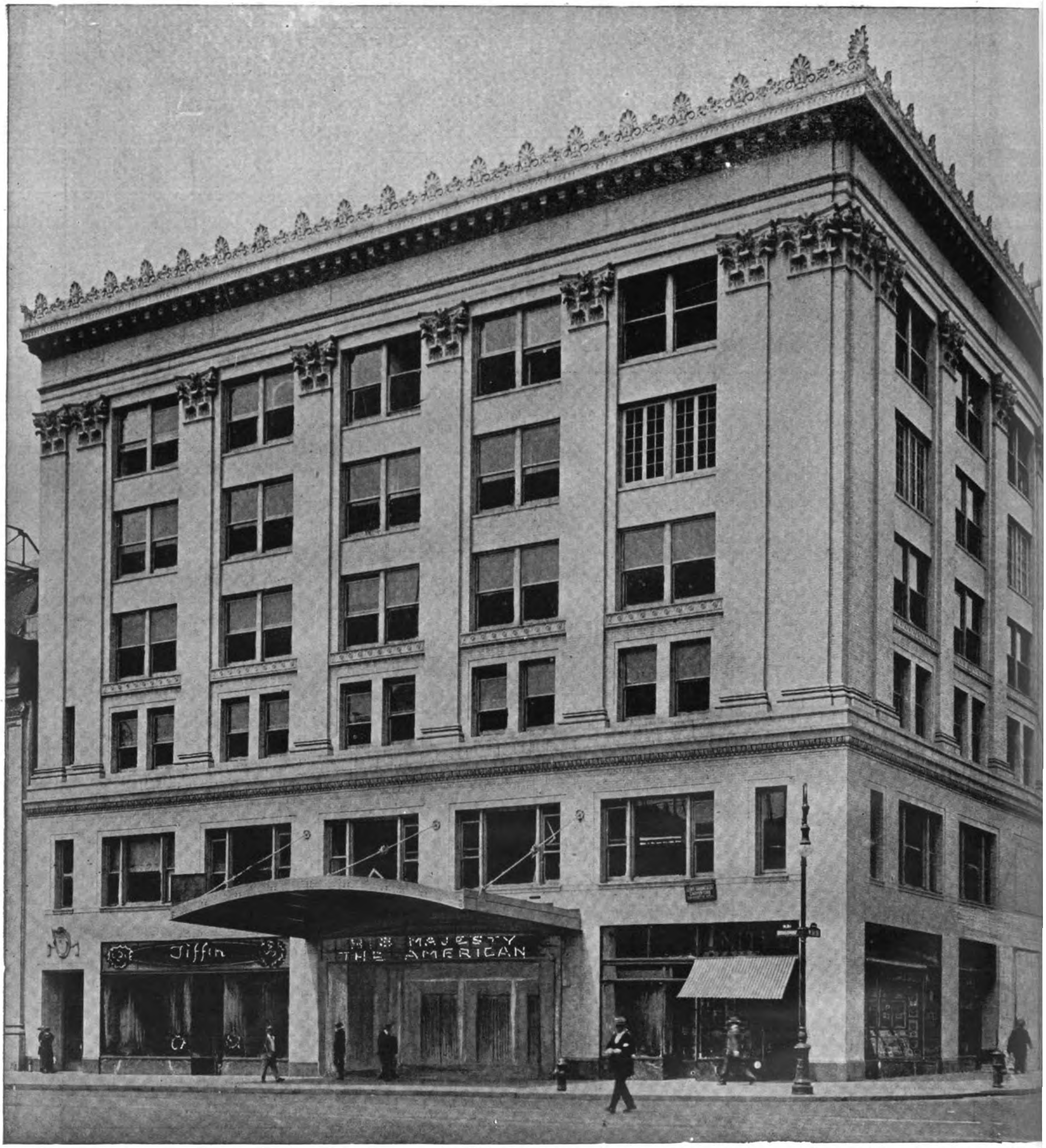

CAPITOL THEATRE, 51ST STREET AND BROADWAY, NEW YORK CITY.
Thomas W. Lamb, Architect.
R. D. Kimball Co., Consulting Engineers.

Built by O'Day Construction Co.; ticket selling devices—The Automatic Ticket Selling & Cash Register Co.; Edison Portland Cement used; sprinkler system—Raisler Sprinkler Co.; structural steel—Paul Chapman.

ARCHITECTURE AND BUILDING

A Magazine Devoted to Contemporary Architectural Construction

WILLIAM P. COMSTOCK
Managing Editor

Volume LII JANUARY, 1920 **Number 1**

HOW COSTS ARE KEPT UNDER THE COST-PLUS-FIXED-FEE CONTRACT.*

No contractor who values his capital can afford to do without adequate cost records, both as a check on the job in progress and as a basis for future estimating. Yet the simpler that system of accounting, the better, and any refinements further than those necessary to give the actual required data are a waste of time and money. Some contractors keep their books under their hats or in the left-hand pocket of their coats, where all invoices go preparatory to paying. At the opposite extreme are firms who maintain a complicated system of accounts, both at the job and at the home office. Accounting methods sufficient for the lump-sum contract may be insufficient for the cost-plus-fixed-fee contract, under which the owner and architect must have access to the accounts at all times.

We have found the following system to be adequate for cost-plus jobs, and with only a few changes this is the system put into effect on such typical work as the four warehouses we have built for Montgomery Ward & Co. at Chicago and Kansas City, the Butler Brothers' Chicago Mail Order Warehouse, Rand McNally & Co.'s Chicago Publishing House and other similar work in this country and Canada.

Occasionally we have found an owner who prefers to be given such data as will permit his own accountants to keep a complete system of books. Generally, however, our accounts, kept on the job and open at all times for inspection, are considered sufficient, in view of the detail statements we render to the owner every two weeks—bearing the approval of the owner's representative, who is designated for that purpose. We urge owners to have their auditors frequently make examinations of accounts for their own satisfaction.

The system we are now using is briefly the keeping of a:

1. Cashbook, Voucher Record and Ledger, combined;
2. Invoice and Payroll Register, combined;
3. Detail Cost Record;
4. Accounts Payable Record (Vendor accounts).

1. The *Cashbook, Voucher Record and Ledger* is used for the recording of all cash received, cash disbursed by vouchers and all journal entries.

2. The *Invoice and Payroll Register* is used for the recording of all invoices and payrolls. The invoices and payrolls are numbered consecutively. This register has columns for date, invoice number, vendor's name, total amounts, both debit and credit, and individual columns for the 20 main accounts used in distribution of costs. The register represents an absolute detail control of all approved charges to the job as only audited and approved items are given a register number or entered. The payrolls are given register numbers and approved the same as invoices. The office copies of all invoices are filed in numerical order in an ordinary letter file drawer, and bound in numerical order, in lots of 50 to 100, using an ordinary heavy file folder for cover, clamping the invoice to the folder.

3. The *Detail Cost Record* is used for recording in detail the distribution of costs among the main accounts as shown on invoice register.

4. The *Accounts Payable* (*or Vendor's Accounts*) *Record* is used for the recording of all invoices from vendors. After the invoices have been entered in the invoice register and detail cost record book, they are entered as a credit to vendor in accounts payable. Each vendor has a separate page or sheet. After entry is made, it is placed in file under vendor's name until ready for payment. When payment is made same is vouchered and charged to accounts payable (vendors' accounts) and cash credited.

Office Routine of Purchase Order, Invoice and Voucher:

Issuance of Purchase Order—in Quadruplicate.—The original of order is sent to vendor, the duplicate is filed numerically (which forms order register), triplicate is filed in open order file—(vendor's name order), quadruplicate—(which forms material receipt or tally sheet) is filed by the office material clerk awaiting receipt of material.

Receipt of Material.—Upon receipt of materials, the office material clerk checks and signs the material receipt portion of the order and files complete with supporting delivery tickets, etc., awaiting invoices.

Checking and Auditing Invoices.—Invoice upon receipt is checked against material receipt or tally sheet for receipt of material. Extension, prices and footings are checked and certified. Cost distribution is checked and entered. Invoice is then audited for discount and cost distribution and certified. Invoice then passes to the superintendent for his approval and the approval of the owner's representative.

Entry of Approved Invoices in Invoice Register and Vendor's Account.—Upon return of approved invoice from the superintendent, the bookkeeper gives the invoice numerical register number and enters in the invoice register. Only fully approved invoices are given register number. Invoice is then posted to the credit of the vendor in accounts payable account and a charge to the detail cost record.

Journalizing Accumulated Totals of Invoices Registered to Ledger.—Accumulated totals in the invoice register are journalized in the ledger (which is also the voucher record) at daily, weekly or semi-monthly periods as is found practical.

Voucher Check.—We have found the voucher check system to be the most convenient. The voucher is made in quadruplicate at the construction office on the job and the approval of the owner's representative is often indicated on all copies of the voucher. The check, or original voucher, goes to the vendor, the duplicate to our general office for our records, the triplicate is kept as the job record and the quadruplicate is the "owner's copy" which is forwarded to the vendor with original to be receipted by him and returned. At intervals, we furnish the owner with statement showing vouchers paid and receipted vouchers attached.

---

*By F. A. Wells, vice-president and treasurer, Wells Brothers Construction Co., Chicago. Ill.

Since the major purpose of cost accounting is to give an adequate basis for future estimating, it is important that so far as practicable the form of cost accounting shall follow the form of estimate. This is not practicable to the last subdivision of each of our general accounts, but sufficient to permit intelligent use of all cost figures. With such figures, it is possible to compare not only final costs, but costs at any stage of the job, with the original estimated cost for that portion of the contract. We frequently divide our estimate by floors, in the case of a many-storied building, in order to have a check upon quantities and upon expenditures at several stages of the work.

Distribution of Accounts.

We use the decimal system of classification of accounts. The classifications number 100 to 600, inclusive, and 900 are for our general books which embrace the assets and liabilities, revenues and income accounts—we will omit these in our discussion of construction cost accounting in connection with cost-plus and fixed-fee contracts.

The general distribution is under the following headings:

700 and 800 construction costs—(summary of general headings).

710 Excavation
720 Caissons
730 Footings
740 Trench and wall
750 Concrete and fireproofing
760 Masonry
770 Carpentry
780
790
800 Plant expense
810 Field overhead
820 Extra work
830 Sub-contracts
840 (sub-contract) Extra work
850
860
870 Repair contracts
880
890 Company expense (not chargeable to owner)

The sub-divisions of headings 710-790 are between the items labor (1), material (2) and liability insurance (3). Thus labor in excavation would be 711, material in excavation 712 and liability insurance in excavation 713.

A further division of the various kinds of labor and materials is made. The following classifications illustrate this point:

Labor.—711
  711.01 Digging (general)
  711.02 Digging sub-basement
  711.03 Sheeting and shoring banks
  711.04 Shoring adjacent building
Material.—712
  712.01 Lumber
  712.02 Underpinning adjacent building
  712.03 Rings (steel)
  712.04 Cement
Liability Insurance.—713

For convenience we have listed the charges of labor and material in the order they usually appear in building construction costs:

Labor
.01 Digging (general)
.02 Digging sub-basement
.03 Sheeting and bracing banks
.04 Shoring adjacent buildings
.05 Underpinning adjacent building
.06 Pumping
.07 Back-filling and grading
.08 Cutting old footings
.09
.10 Placing lagging and rings
.11 Ventilating
.12 Mixing and placing concrete
.13 Building forms general
.14 Building forms exterior columns
.15 Building forms interior columns
.16 Building forms spandrels
.23 Lay brick
.26 Bend steel
.35 Set cut stone
.44 Fit and hang doors
.56 Unload and handle material, etc.
.60 Clean up rubbish
Add as many new accounts as are needed.

Material
.01 Lumber
.02 Underpinning adjacent building
.03 Rings (steel)
.04 Cement
.05 Sand
.06 Stone
.07 Brick
.08 Wall tie and inserts
.09 Steel (structural)
.10 Steel (reinforcing)
.11 Nails and wire
.12 Clamps, purchased or rented
.13 Tile
.14 Protection (lumber, etc.)
.15 Terra cotta
.16 Granite
.25 Frames and sash
.30 Interior trimings
.35 Coping

Should charges be made in connection with concrete and fireproofing under subdivision 750, they would follow the same order as in excavation:

751.12 (Labor)—Mixing and placing concrete
752.04 (Material)—Cement
753 Liability insurance

or, carpentry—subdivision 770.

771.44 (Labor)—Fit and hang doors
772.25 (Material)—Frames and sash
773 Liability insurance.

Classification of Plant Expense.

Subdivision 800 covers plant expense and conforms with the sub-classification of the 700 accounts as much as practicable.

The following are the headings under 800:

801 Excavation
802 Caissons
803 Footings
804 Sawmill
805 Concrete and fireproofing
806 Masonry
807
808
809 General (items charged to general eqipment).

A further typical subdivision of the accounts under this heading is:

801 Excavation
801.1 Transportation (of equipment plant)
801.2 Erection of equipment
801.21 Labor
801.22 Material
801.3 Equipment on charge and credit basis
801.31 Labor
801.32 Material
801.4 Rental of equipment
801.5 Fuel, lubricants and power
801.6 Repairs
801.7

Should charges to plant in connection with concrete and fireproofing be made, they would be charged as 805 with divisions shown above.

Field Overhead.

811 *Salaries, General Labor and Expenses*
  811.1 Superintendent and engineers
  .2 Office employes
  .3 Materialmen and timekeepers
  .4 Laying out building
  .5 Watchman
  .6 Waterboys
  .7 Toolmen
  .8 Liability insurance, superintendent and watchman
  .9 Traveling expenses of superintendent, engineer and office men.
812 *Engineering Expense*
  812.1 Plans, detail and engineers' supplies
  .2 Photographs
  .3 Engineering service
  .4 Architects fees
  .5
813 *Office Expense*
  813.1 Rent, light and heat
  .2 Stationery and printing
  .3 Telephone
  .4 Telegraph
  .5 Postage and expressage
  .6 Rent on adding machine and typewriters
  .7 Furniture
  .8
  .9 Miscellaneous office expense, towels, etc.
814 *Other Fixed Field Expenses*
  814.1 Bonds (maintenance and construction)
  .2 Permits and licenses, boiler inspection
  .3 Fire insurance
  .4 Legal services
  .5 Burglar insurance
  .6 Association dues
  .7 Advertisements
  .8 Floor tests
  .9 Ring tests
815
816 *Temporary Structures (Labor and Material)*
  816.1 Offices
  .2 Toilets
  .3 Toolhouse, blacksmith shops, storage sheds, etc.
  .4 Stairs and ladders
  .5 Fences, sidewalks, covers and other enclosures
  .6 Temporary platform and driveways
  .7
  .8 Repairs and protection to adjacent property
  .9 Protection to public utilities.
817
818 *Temporary Light, Heat and Power*
  818.1 Light
  .2 Heat
  .3 Power
819 *General Cleaning*
  819.1 Labor
  .2 Teaming
  .3
820 *Extra Work*
  821.1 Use as many numbers as accounts charged
  822
830 *Sub-Contracts*
  831 Wrecking, excavating and shoring, etc.
  831.1 Wrecking contract
  .2 Excavation contract
  .3 Shoring contract
  .4
832.1 Sub-heading for each kind of sub-contract
832.1 Sub-heading for each kind of sub-cement
833 Interior construction
834 Painting and glazing
835 Mill work
836 Roofing
837 Fireproof doors and windows
838 Interior finish
839 Structural steel
840 *(Extra Work) Sub-Contracts*
841 Sub-heading for each kind of work done
850
860
870 *Repair Contracts* (for small jobbing contracts)
890 *Company Expense* (not charged to owners)
891 Sub-headings for each kind of expense

Detailed Statement of Construction Cost.

At stated periods we take from the cost records a summary and detail statement of construction costs in the following form:

Acct. No. Name of Acct. Item Amount Cost per Unit
Est. Cost Diff.

The last column is in black or red; naturally the red items will have careful scrutiny to ascertain why costs are running above estimate. This statement is primarily for our own use, but the owner may have a copy if he wishes.

Owner Knows Total Expenditure at All Times.

Under the cost-plus-fixed-fee contract, the owner generally furnishes the funds to finance the contract. We maintain an entirely separate bank account for each cost-plus contract representing the owner's funds, and where agreeable to the owner, we arrange for the owner's representative to countersign all checks drawn by us on this account. At the start of the work, we furnish an estimate of the anticipated amount of labor and material bills covering an initial period of two weeks or more to the owner, who then advances the funds to cover these requirements. When the owner's receipted copies of vouchers coverings this period are returned from the vendors, a statement is given to the owner showing amounts actually paid for payrolls, materials and sub-contract work, with receipted vouchers attached. That total is then credited to us by the owner on account of contract.

The advantages of having all accounts handled at the job are apparent. The distribution, if not clear from the purchase order, can be referred to the superintendent and the fact that the books of accounts are at all times open for the owner's inspection, is an assurance to him of honest treatment. The fact that he approves purchases of materials before made and again has the opportunity of questioning invoices prior to payment, leaves the control with him and prevents the accumulation of minor, disputed items, which, if left for settlement until the completion of the contract, might not be readily explained.

But a system of accounts, no matter how perfect, cannot influence the cost of work except as it points out from time to time divergence from the preliminary estimate and unless such differences are promptly taken in hand, the reasons investigated and the remedy applied. The success of work under the cost-plus contract is still dependent upon the integrity of the contractor and his ability to perform.

We have used this system of accounting with entire satisfaction to firms mentioned above in this article and to many others. This is adequate proof that the cost-plus contract is workable and that the owners not only feel safe but prefer this method because under it 90 per cent. of the savings under the preliminary estimate accrue to the owner, because the 10 per cent. retained by us is a reasonable incentive for us to make every possible saving and because additional costs incurred through no fault or omission of the contractor are rightly chargeable against the builder and should not reduce or wipe out his profit. There is incentive for the contractor to make all possible savings under both old and new contract and some of the savings must go to the contractor to give him that incentive. 10 per cent. we believe to be adequate and the 90 per cent. going to the owner builds up for us a good-will account which practically assures repeat orders as new work becomes necessary. The building of a relationship which will insure repeat orders is just as important in contracting as in merchandising.

Chimneys and Flues.*

1. Build all chimneys from the ground up. None of their weight should be carried by anything except their proper foundations. Foundations should be at least 12 inches wider all around than the area of the chimney and be started well below the frost line.

No chimney should be started or built upon any floor or beam of wood. When a chimney is to be cut off below in whole or part, it should be wholly supported by brick or stone work, or steel construction, properly erected from the ground up. The practice of supporting chimneys or flues on wooden or iron brackets, or iron stirrups, however carefully devised, is hazardous. A small fire around the base from any cause may drop the flue and allow draft for rapid spread of fire.

2. Build all chimneys to a point at least 3 feet above flat roofs, and 2 feet above the ridge of peak roofs.

Under no circumstances should the brick work of the chimney be extended out over the roof by the projection of the course of brick nearest to it. Such a shoulder of overhanging projection will inevitably cause cracks in the chimney in case the chimney settles, the roof in such event lifting the upper portion by means of the overhang, or shoulder, and causing a crack at the most dangerous of all places. The chimney should be carried up of uniform thickness to the top, copper flashing being relied upon to prevent leaks at the joint with the roof.

3. Never build a chimney wall less than eight inches (two courses of brick) in thickness, and use only cement mortar up to the first floor and above the roof line.

(Chimneys with but 4-inch exterior walls are commonly permitted, and if lined with fire clay are reasonably safe; but they frequently crack and are also easily chilled, which causes a bad draft.) Where fireplaces are built of stone, the minimum thickness of the wall should be 12 inches.

The upper part of chimney walls may be only four inches in thickness, from a point at least six inches above the roof to the top of chimney, provided the chimney be capped with terra cotta, stone or cement, or the bricks be carefully bonded or anchored together.

The best coping is a three-inch blue stone, and it is important to see that the holes cut in the capstone correspond in size with the flues, otherwise shoulders will be formed and the draft of the flue interfered with.

4. In brick buildings the walls of buildings, when not less than 13 inches in thickness may form part of chimney or flue. In no case should a chimney or flue be corbeled out more than 8 inches from the wall, and in all cases the corbeling should consist of at least five courses of brick. Flues in party walls should not extend beyond the center of said walls.

5. Build all chimneys large enough to give a separate flue for each fire, using fire clay or terra-cotta tile linings at least one inch in thickness.

The fire clay lining is not subject to disintegration by any of the ordinary flue gases.

The lining should be put in as the flue is constructed, using great care to see that the joints in same are carefully made.

When two or more separate flues are provided in chimney, the division walls between flues may be only four inches in thickness.

Two connections to a single flue will result in fire from one communicating to the opening of the other and thousands of fires have originated in this manner.

Flues in throat capacity should not be less than eight inches square on the inside, and for fireplaces in which wood is to be used they should be eight by twelve inches (or better, 12x12 inches) in the clear. A good rule is to make the flue size not less than one-tenth of the area of the fireplace opening. Green or unseasoned firewood will require a flue of this size to insure a good draft and prevent smoking. The furnace flue should also be not less than eight by twelve inches in any case.

Be careful to see that the flues are properly built. Faults cannot be remedied afterwards. All flues should be as nearly vertical as possible.

Masons are often careless about lining the flue even where the specifications call for it, and are apt to omit it until they get to the straight part of the flue. This makes

(*Continued on page 7*)

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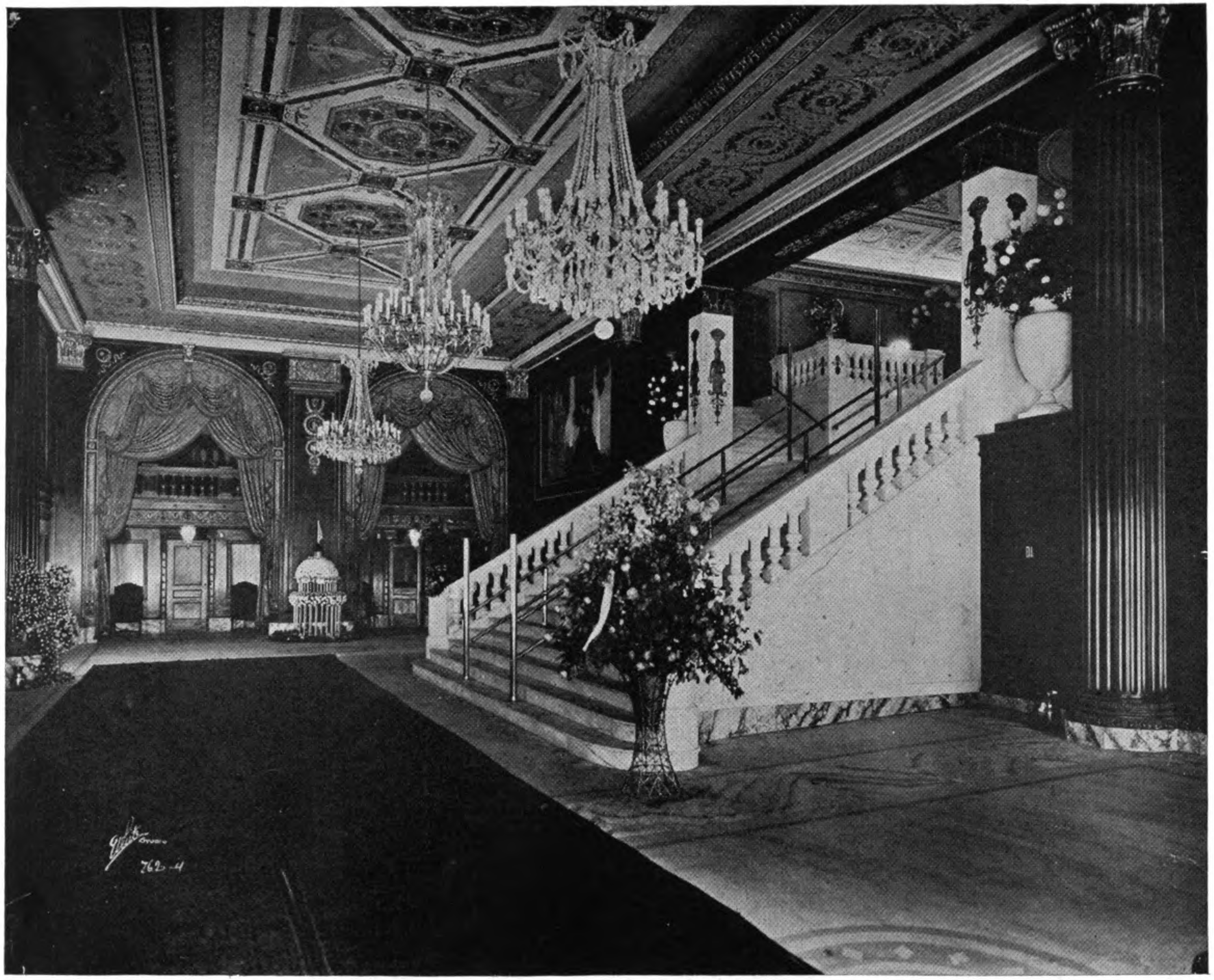
*By Franklin H. Wentworth, secretary of the National Fire Protection Association.

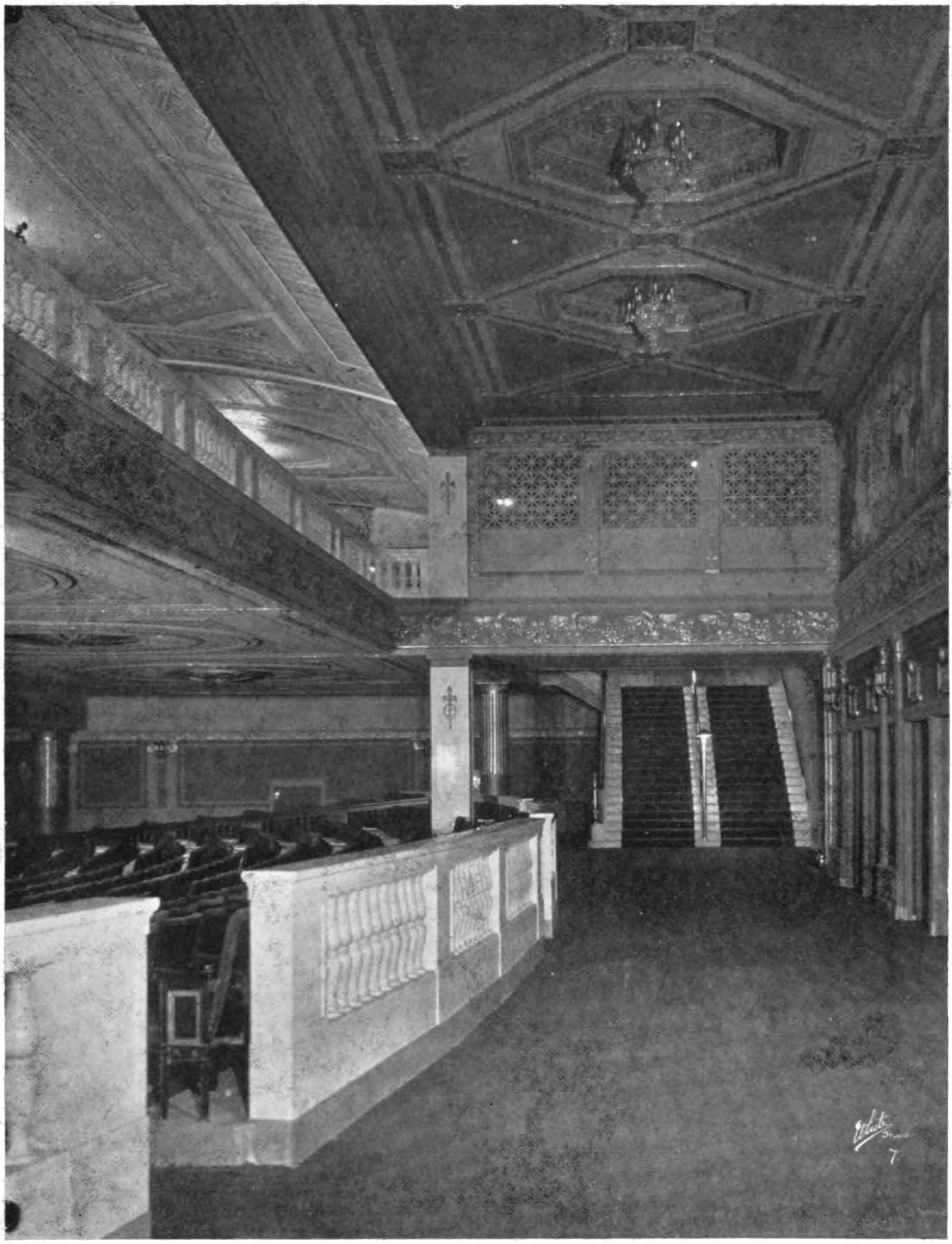


MAIN LOBBY, SHOWING GRAND STAIRCASE, CAPITOL THEATRE, 51ST STREET AND BROADWAY, NEW YORK CITY.

Thomas W. Lamb, Architect.
R. D. Kimball Co., Consulting Engineers.

Architecture and Building. Plate 1.

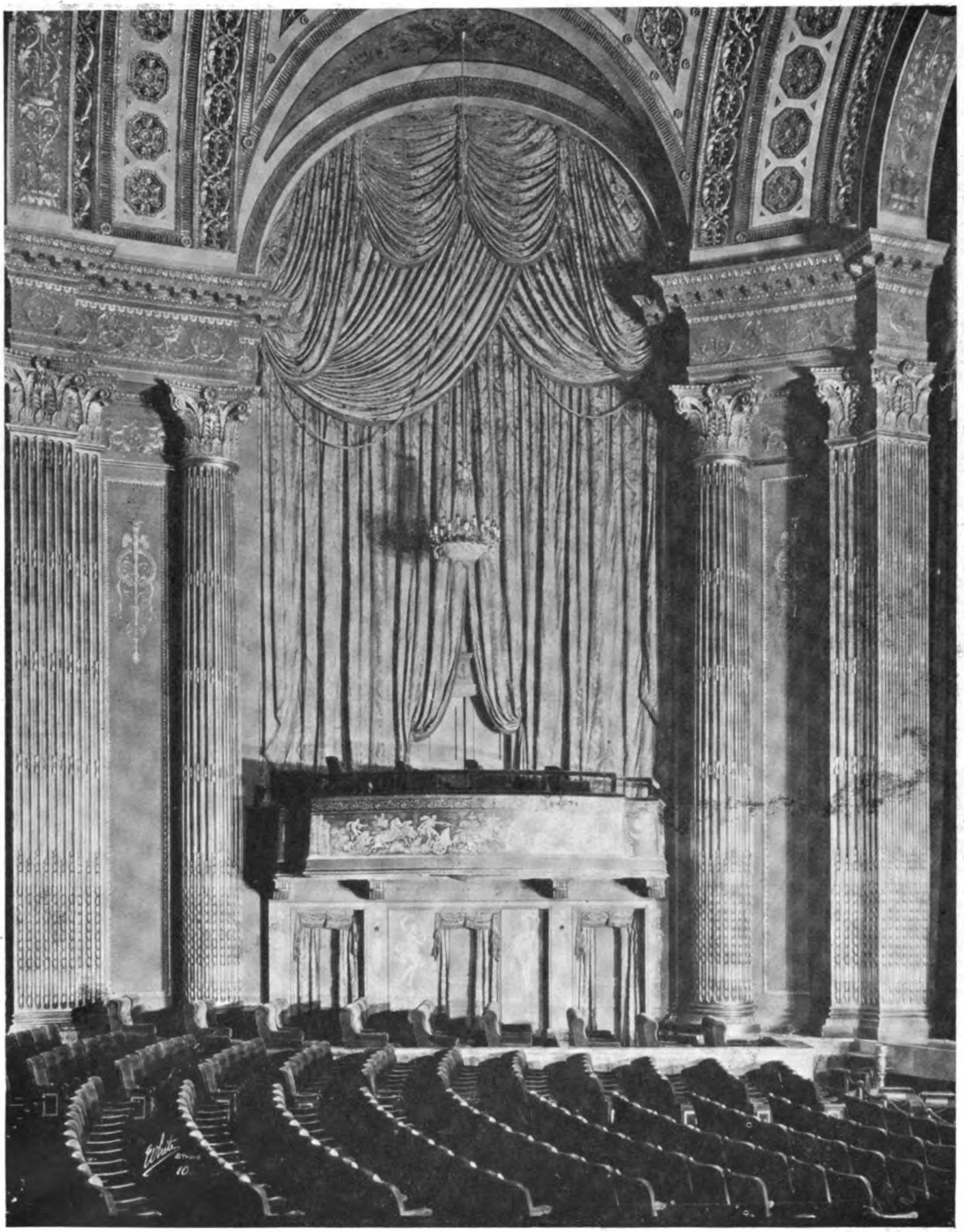
Built by O'Day Construction Co.; lighting fixtures—Black & Boyd Mfg. Co.; electrical contractors—Edwards Electrical Construction Company; Carrara Statu- [illegible] Piccirilli Bros.; ornamental iron—A. Perlman Iron



FOYER, CAPITOL THEATRE, 51ST STREET AND BROADWAY, NEW YORK CITY.

Thomas W. Lamb, Architect.
R. D. Kimball Co., Consulting Engineers.

Built by O'Day Construction Co.; Edison Portland Cement used; interior marble —John H. Shipway & Bro.

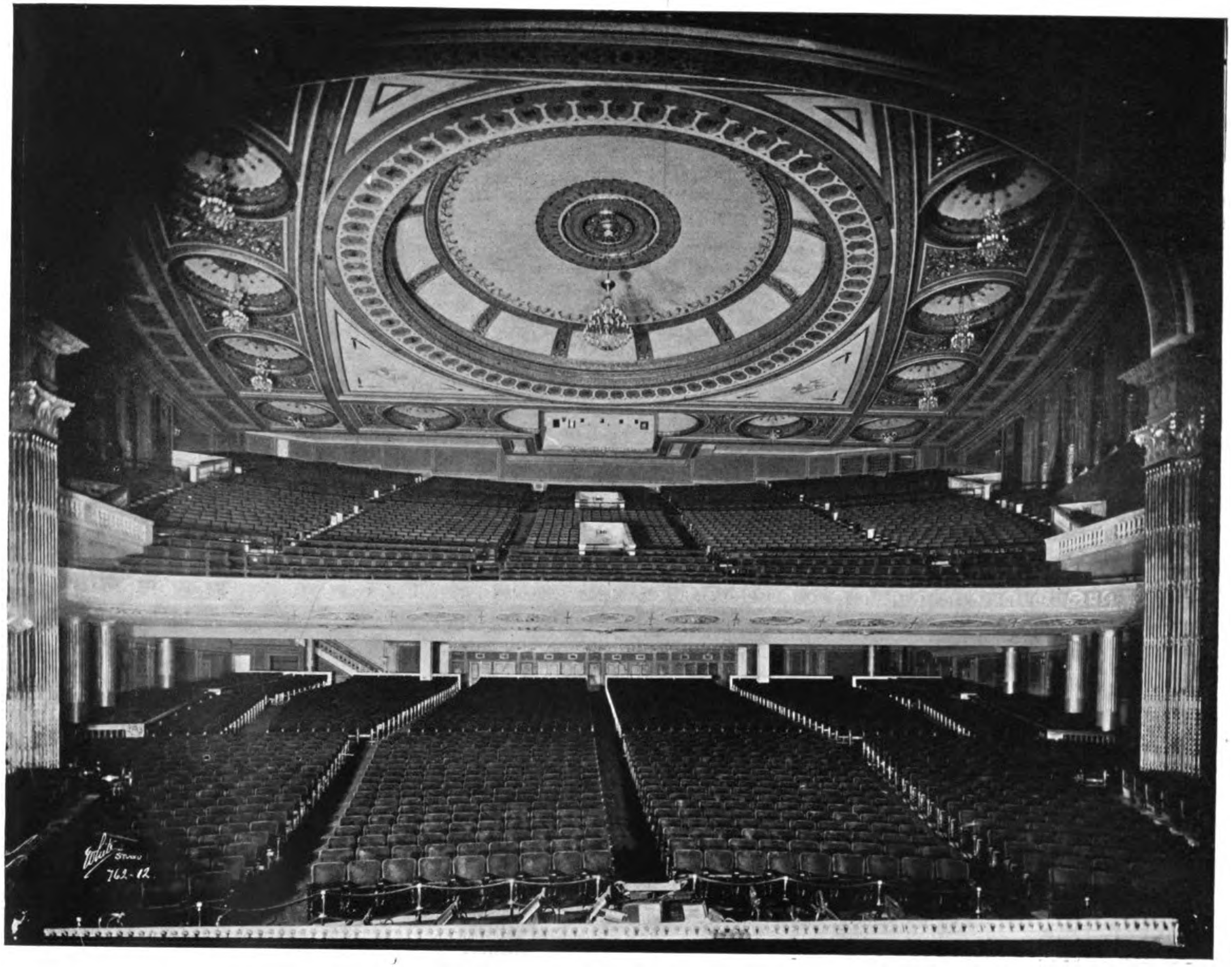


DETAIL OF BOXES, CAPITOL THEATRE, 51ST STREET AND BROADWAY, NEW YORK CITY.

Thomas W. Lamb, Architect.
R. D. Kimball Co., Consulting Engineers.

ARCHITECTURE AND BUILDING. Plate 3.

Decorations and painting—Cooper, Sampietro & Gentiluomo; draperies and upholstered furniture—Freeman Bros., Inc.; seats—American Seating Co.

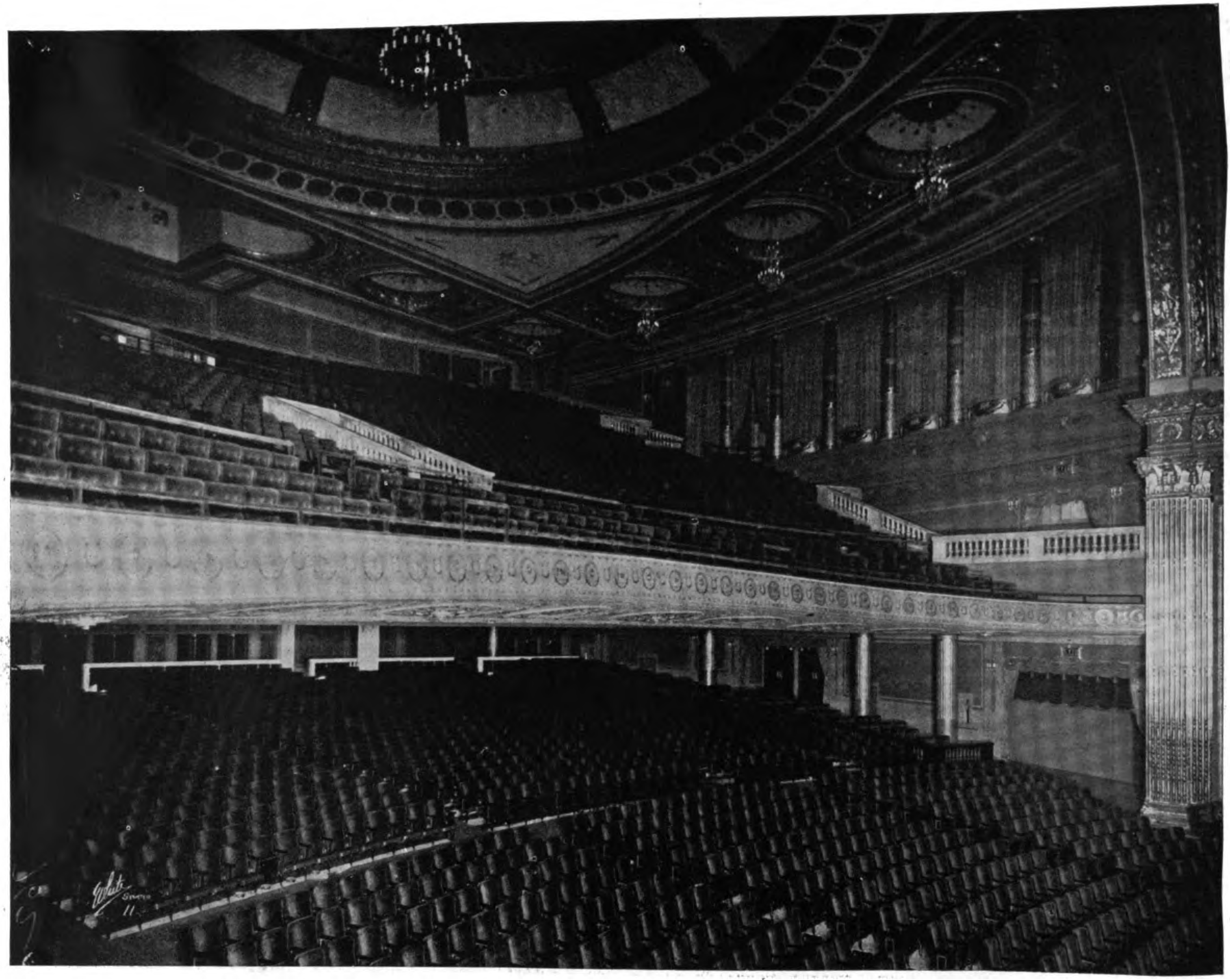


AUDITORIUM, CAPITOL THEATRE, 51ST STREET AND BROADWAY, NEW YORK CITY.

Thomas W. Lamb, Architect.
R. D. Kimball Co., Consulting Engineers.

ARCHITECTURE AND BUILDING. Plate 4.

Built by O'Day Construction Co.; decorations and painting—Cooper, Sampietro & Gentiluomo; Edison Portland Cement used; seats—American Seating Company; cove lights, border and foot lights—New York Calcium Light Co.; revolving stairs and stage scenery made by T. B. McDonald Construction Company; stage rigging and asbestos curtain—William Camph; Knowles Mushroom Ventilators used; flooring—Indiana Flooring Co.

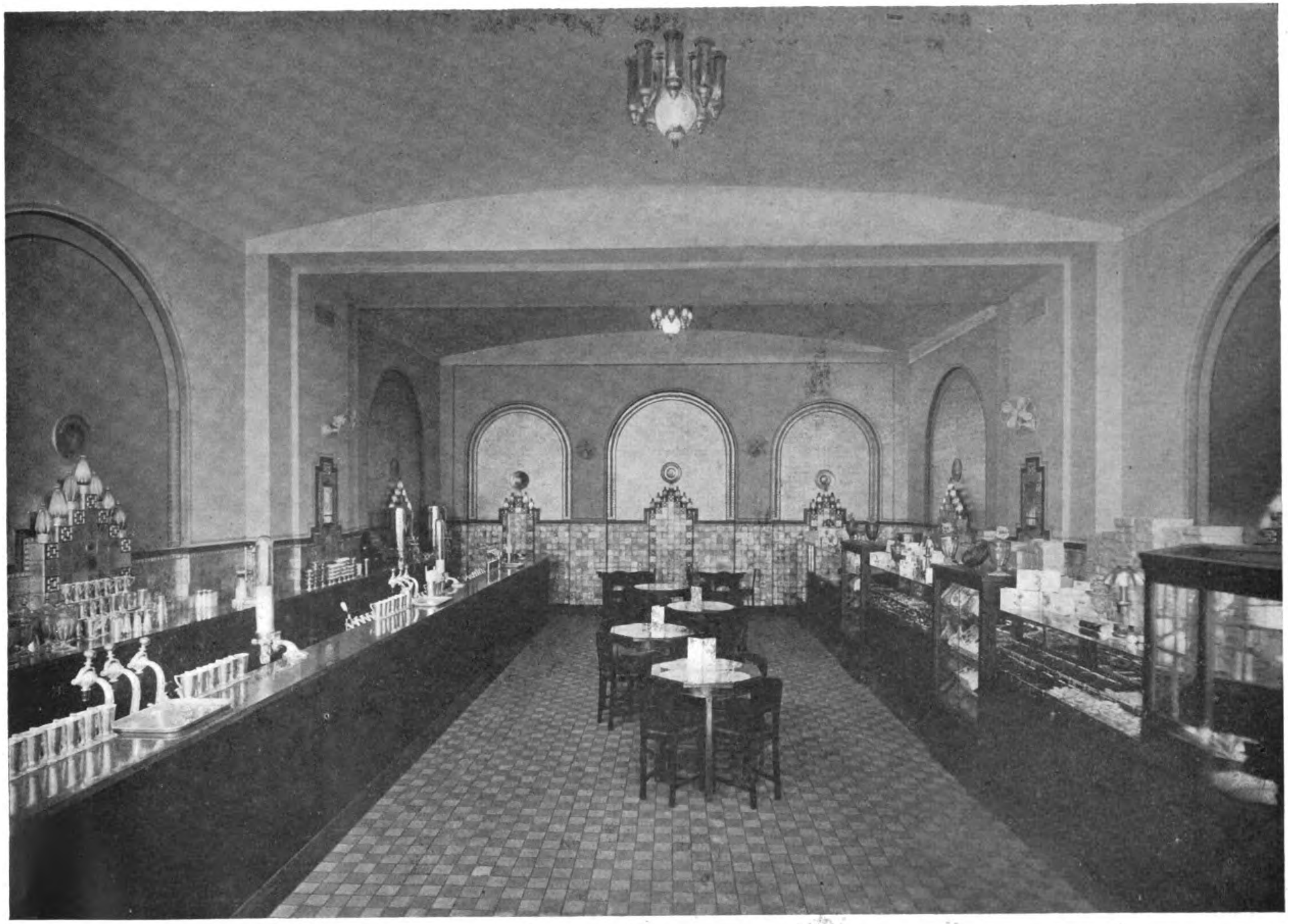


AUDITORIUM, CAPITOL THEATRE, 51ST STREET AND BROADWAY, NEW YORK CITY.

Thomas W. Lamb, Architect.
R. D. Kimball Co., Consulting Engineers.

ARCHITECTURE AND BUILDING. Plate 5.

Lighting fixtures—Black & Boyd Mfg. Co.; moving picture machines made by Precision Machine Co.; moving picture machines, spot lights and screen furnished by B. F. Porter; stage scenery painted by Lee Lash Co.; Superior standard automatic stage ventilator installed; elevator door hangers—Richards & Wilcox Mfg. Co.; plumbing—Charles H. Darmstadt, Inc.; Savoy Claire marble supplied by Pisani Bros.

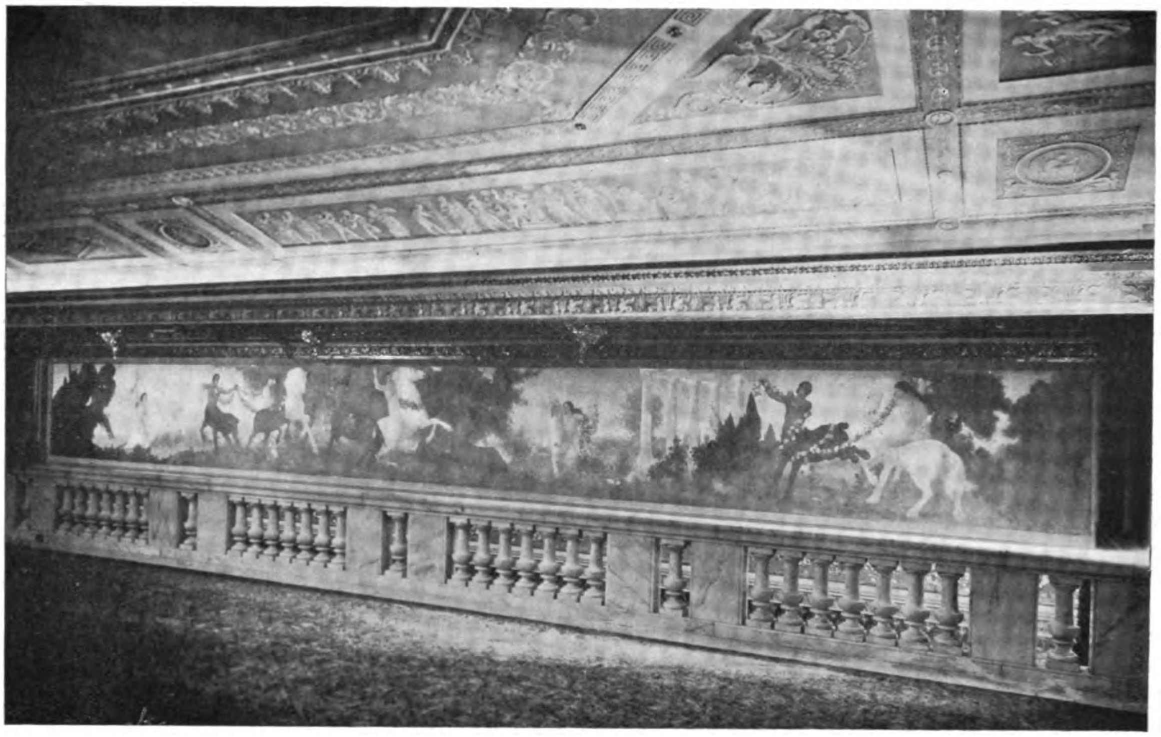


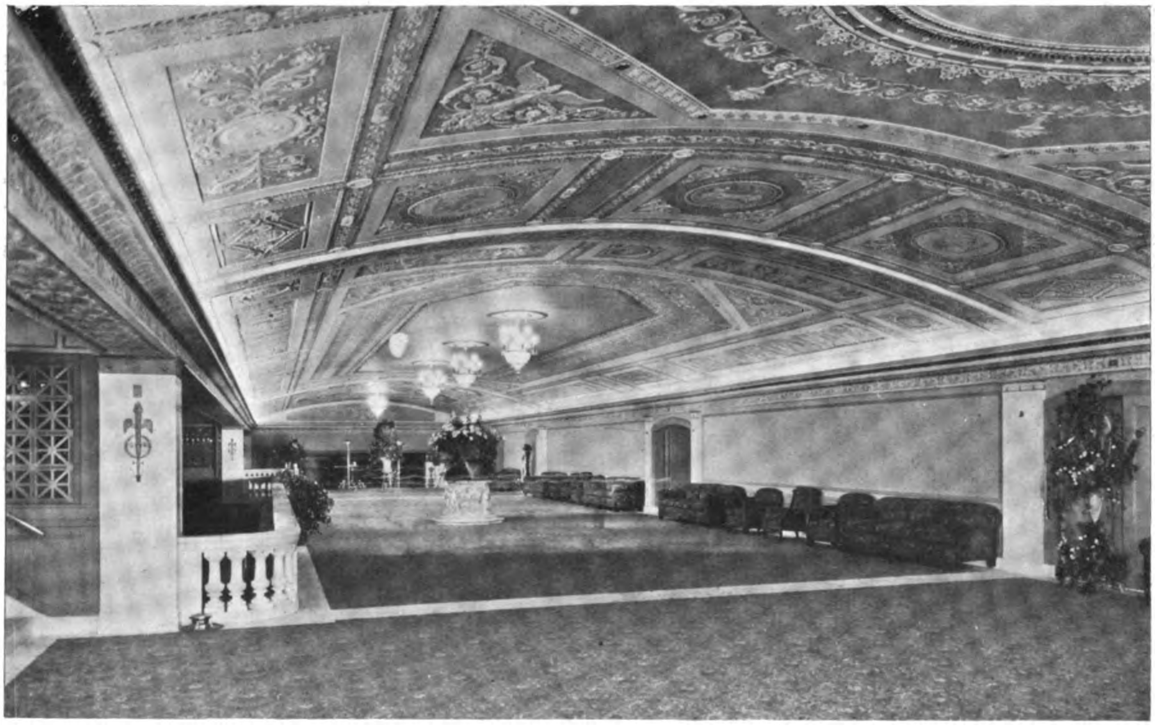
TIFFIN SHOP, LOCATED IN CAPITOL THEATRE BUILDING, 51st STREET AND BROADWAY, NEW YORK CITY.

John J. Petit, Architect.

ARCHITECTURE AND BUILDING. Plate 6.

Decorations—Righter & Kolb; wall-tiling, lighting fixtures and lighting effects executed by The Tiffany Furnaces; Frink reflectors used; tables and chairs—The Reischmann Co.; soda fountain equipment—Liquid Carbonic Co.

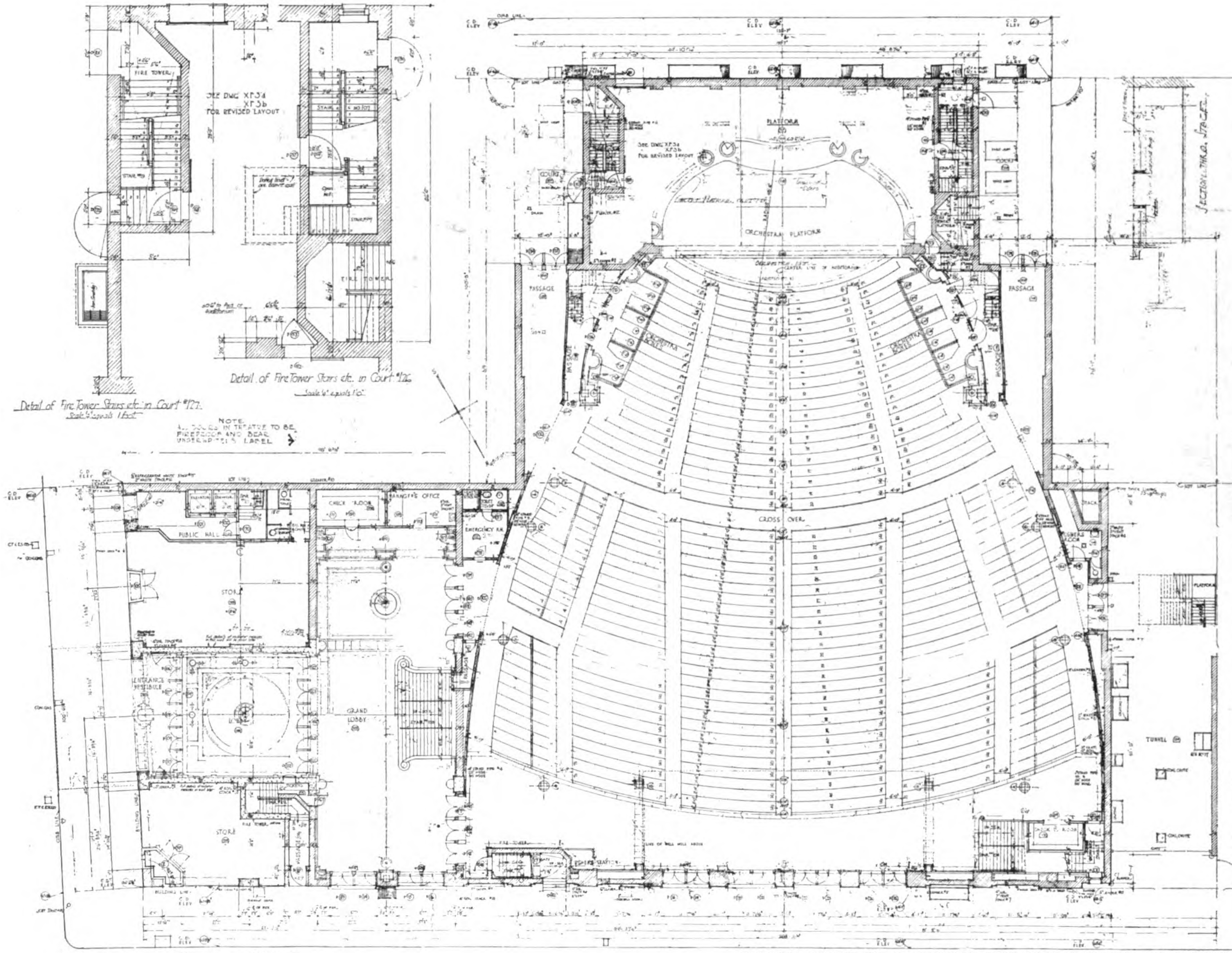




MEZZANINE SHOWING MURAL DECORATIONS, CAPITOL THEATRE BUILDING, 51ST STREET AND BROADWAY, NEW YORK CITY.

Thomas W. Lamb, Architect.
R. D. Kimball Co., Consulting Engineers.

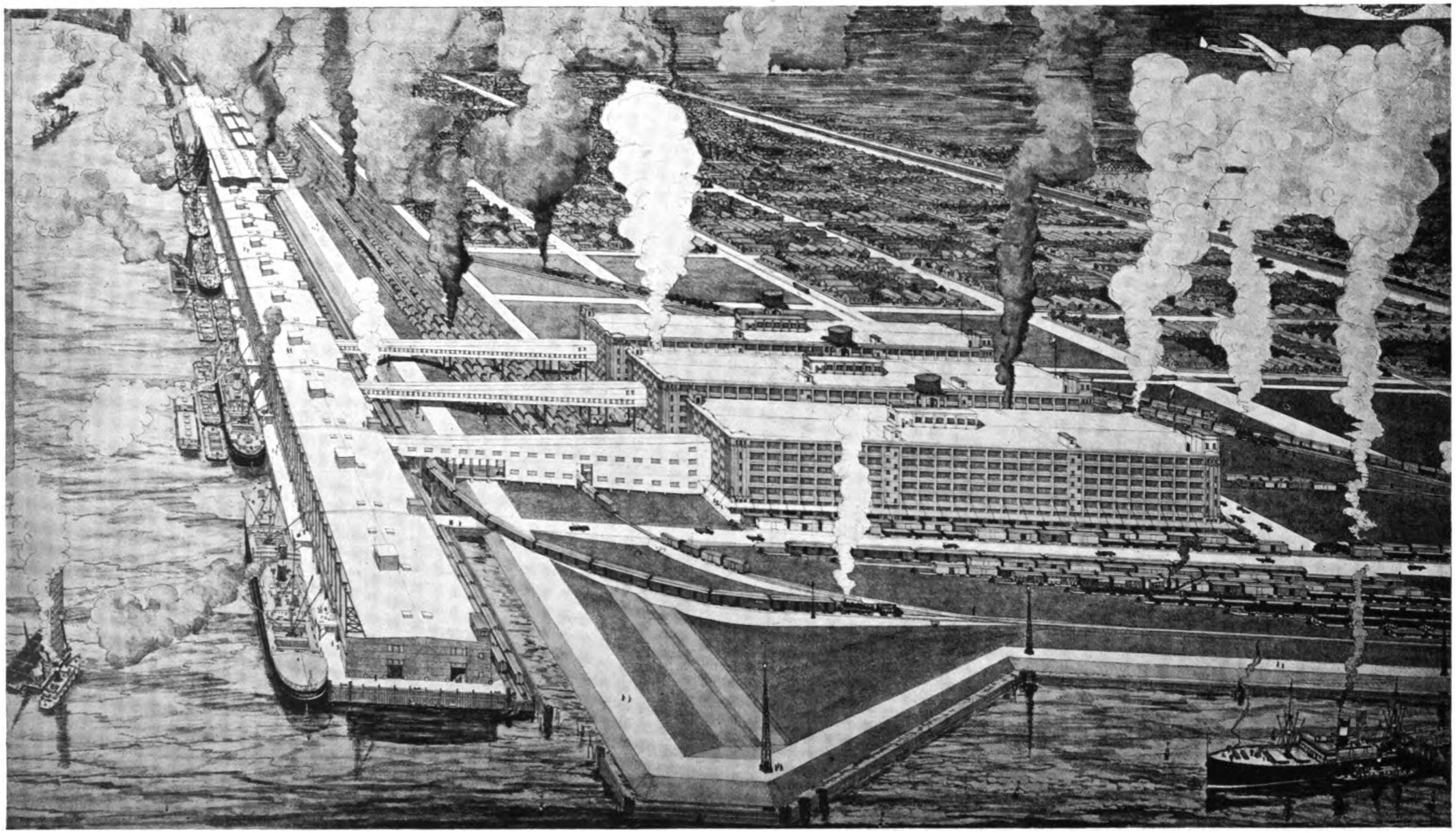
ARCHITECTURE AND BUILDING Plate 7.
Mural paintings—William Cotton; upholstered furniture—Freeman Bros., Inc.



Architecture and Building. Plate 8.

GROUND STORY PLAN, CAPITOL THEATRE BUILDING, BROADWAY, 50TH TO 51ST STREETS, NEW YORK CITY.

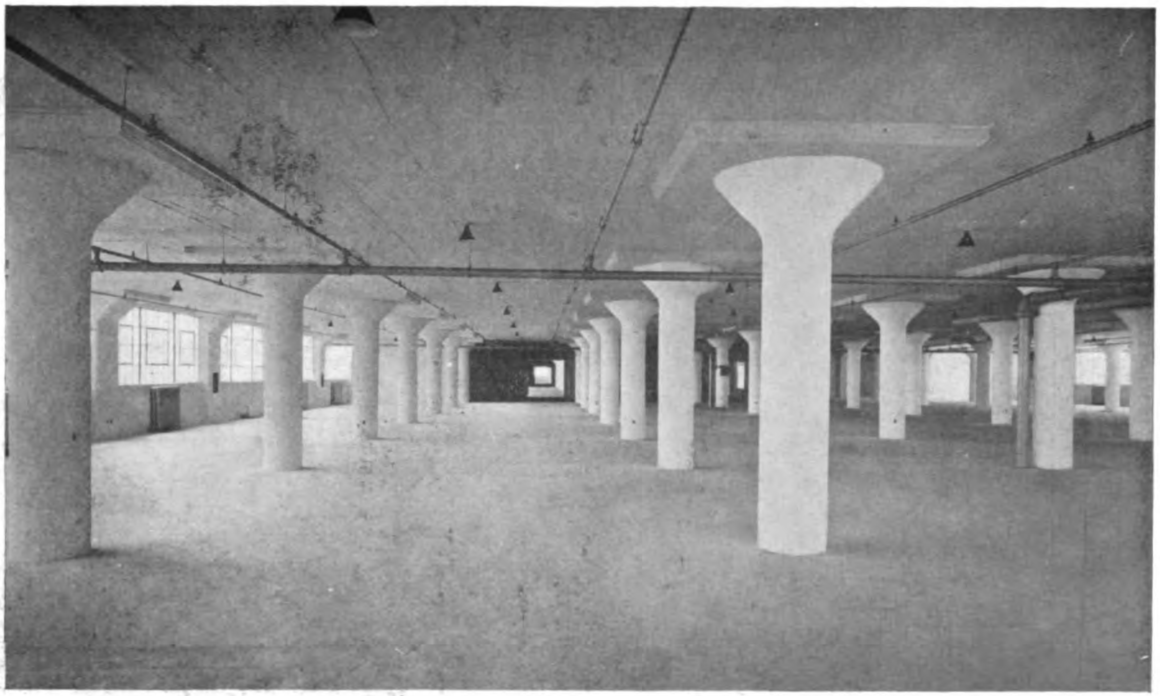
Thomas W. Lamb, Architect.

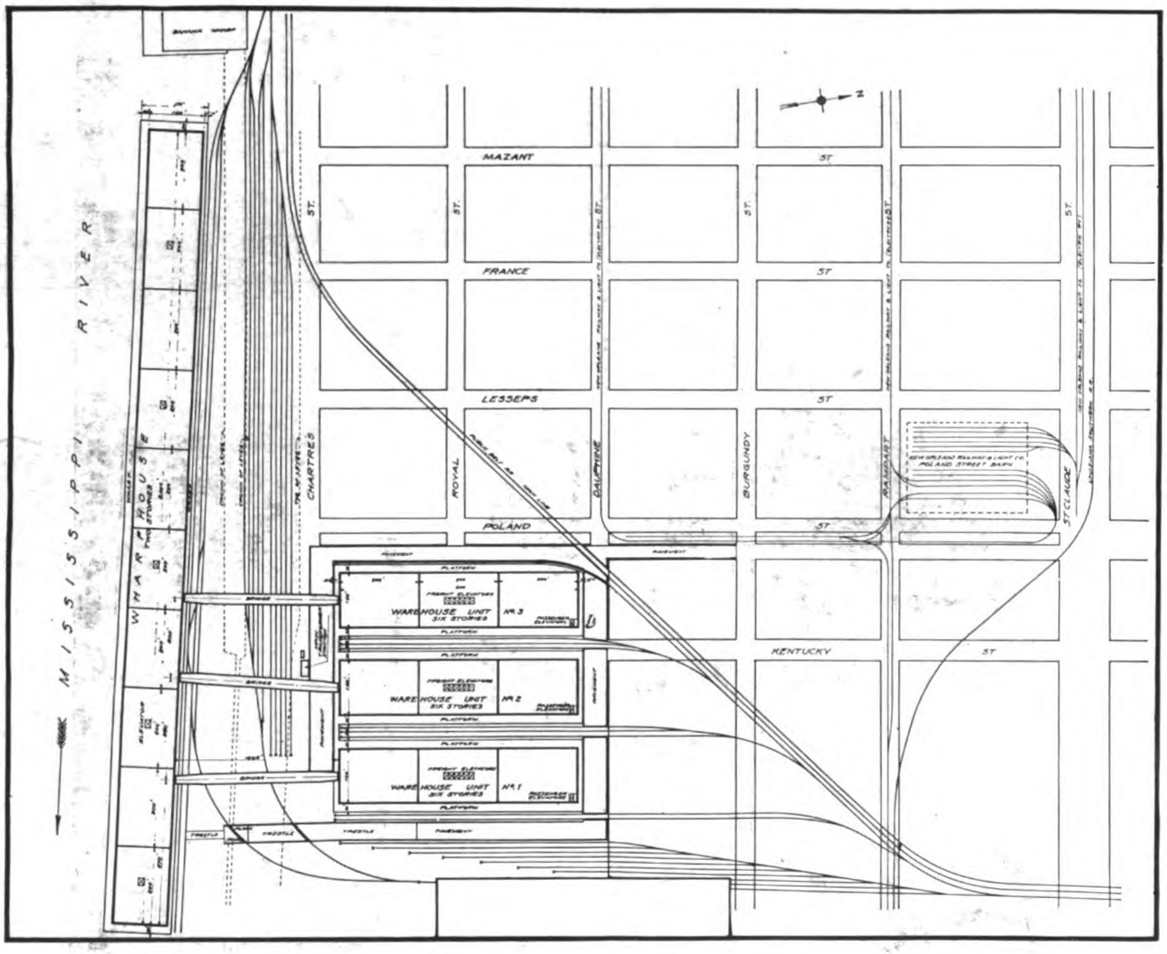


PERSPECTIVE, U. S. ARMY SUPPLY BASE, NEW ORLEANS, LA.
Ford, Bacon & Davis, Engineers.
A. Pearson Hoover, Lt.-Col. Q. M. C., Constructing Quartermaster.

ARCHITECTURE AND BUILDING. Plate 9.

Built by George A. Fuller Company; cast iron water main pipe and fittings—National Cast Iron Pipe Co.

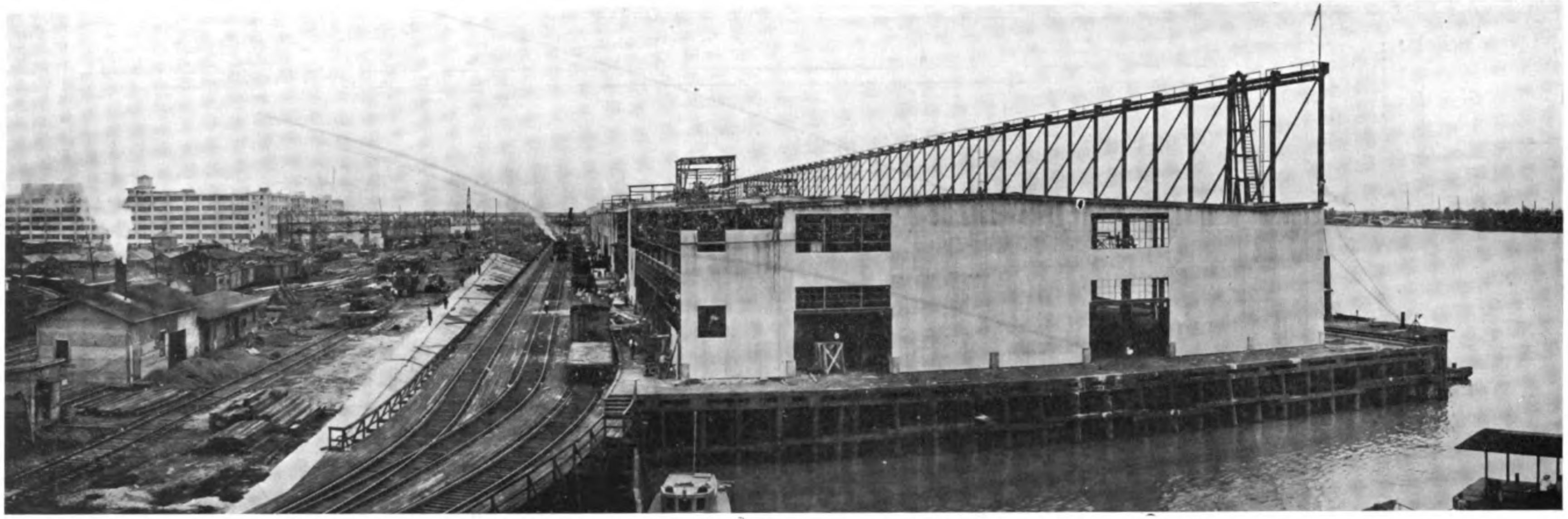


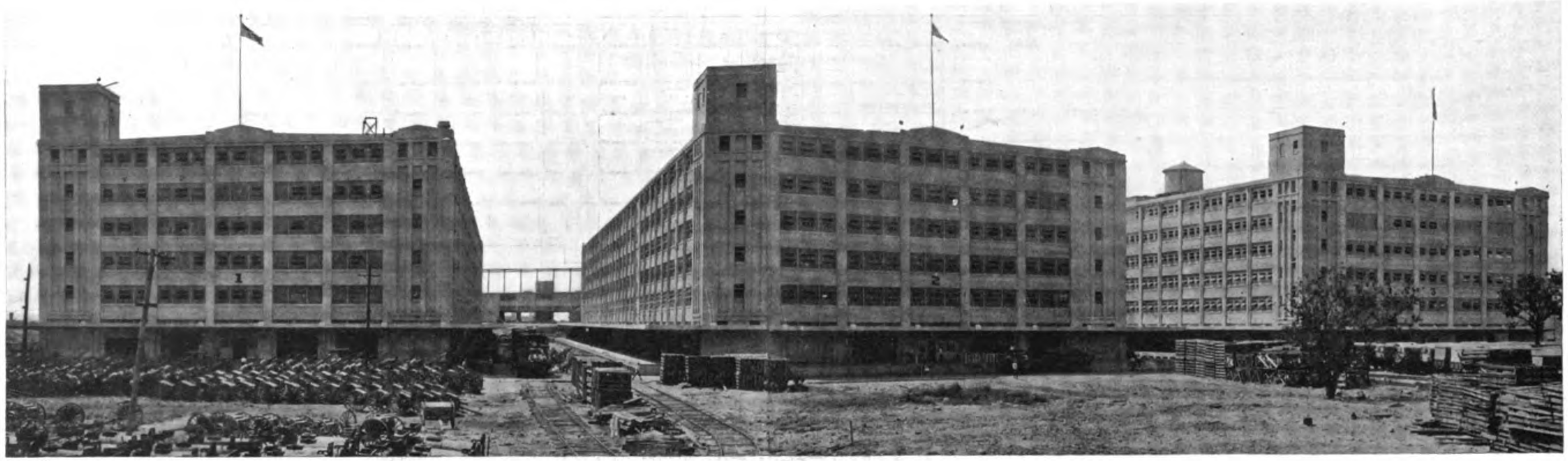


GENERAL PLAN AND VIEW IN TYPICAL STORY, U. S. ARMY SUPPLY BASE, NEW ORLEANS, LA.

Ford, Bacon & Davis, Engineers.
A. Pearson Hoover, Lt.-Col. Q. M. C., Constructing Quartermaster.

ARCHITECTURE AND BUILDING. Plate 10.
Built by George A. Fuller Company; sprinkler system—Globe Automatic Sprinkler Co.; floors—Builders Material Supply Co.





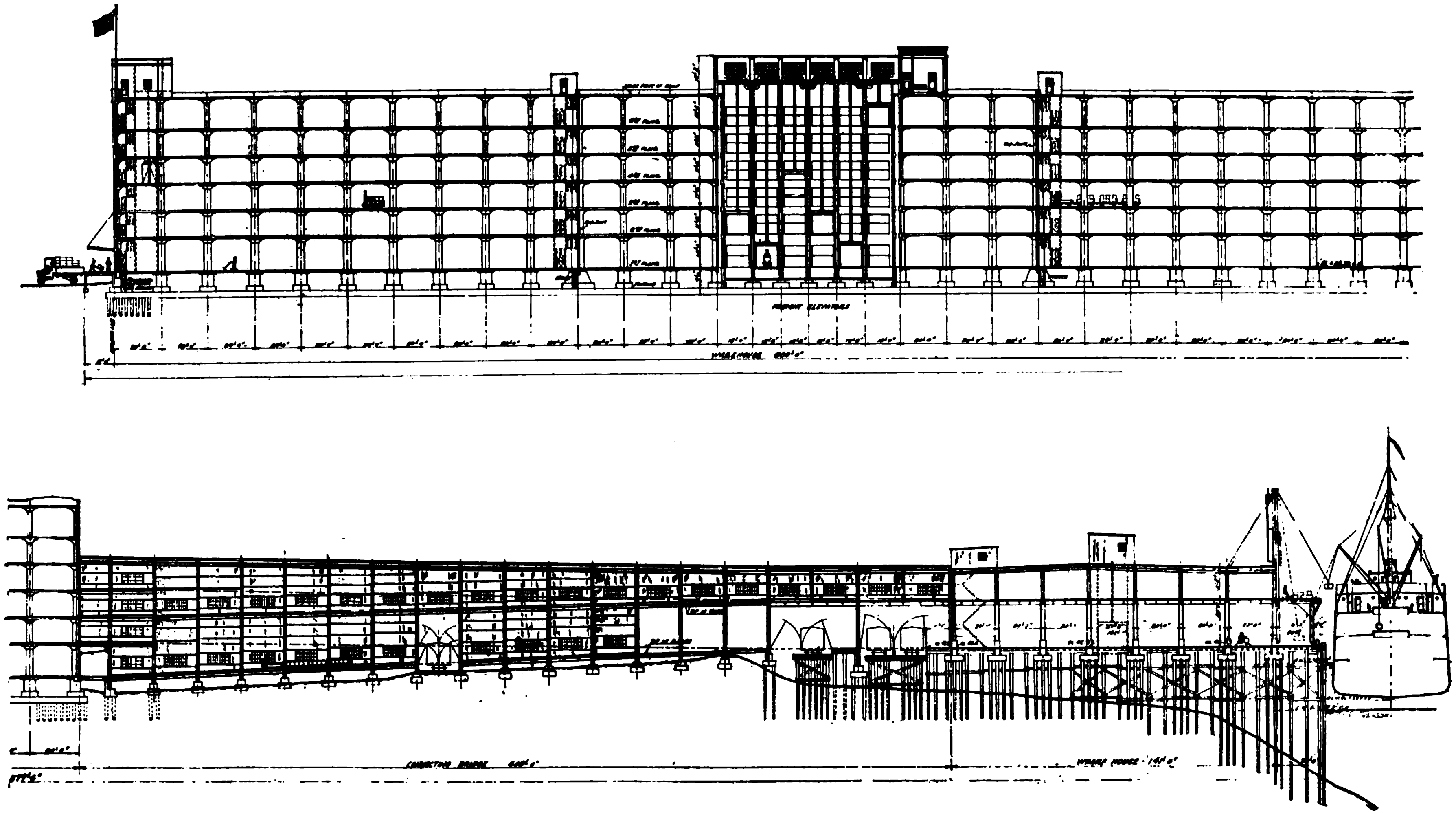
Architecture and Building. Plate 11.

Built by George A. Fuller Company; motors—Westinghouse Electric & Mfg. Co.; elevators—Houghton Elevator & Machine Company.

ABOVE, UPPER END OF WHARF WITH WAREHOUSES IN THE LEFT BACKGROUND.

BELOW, DAUPHINE STREET FRONTAGE OF THE WAREHOUSES SHOWING THE WHARF BEYOND, U. S. ARMY SUPPLY BASE, NEW ORLEANS, LA.

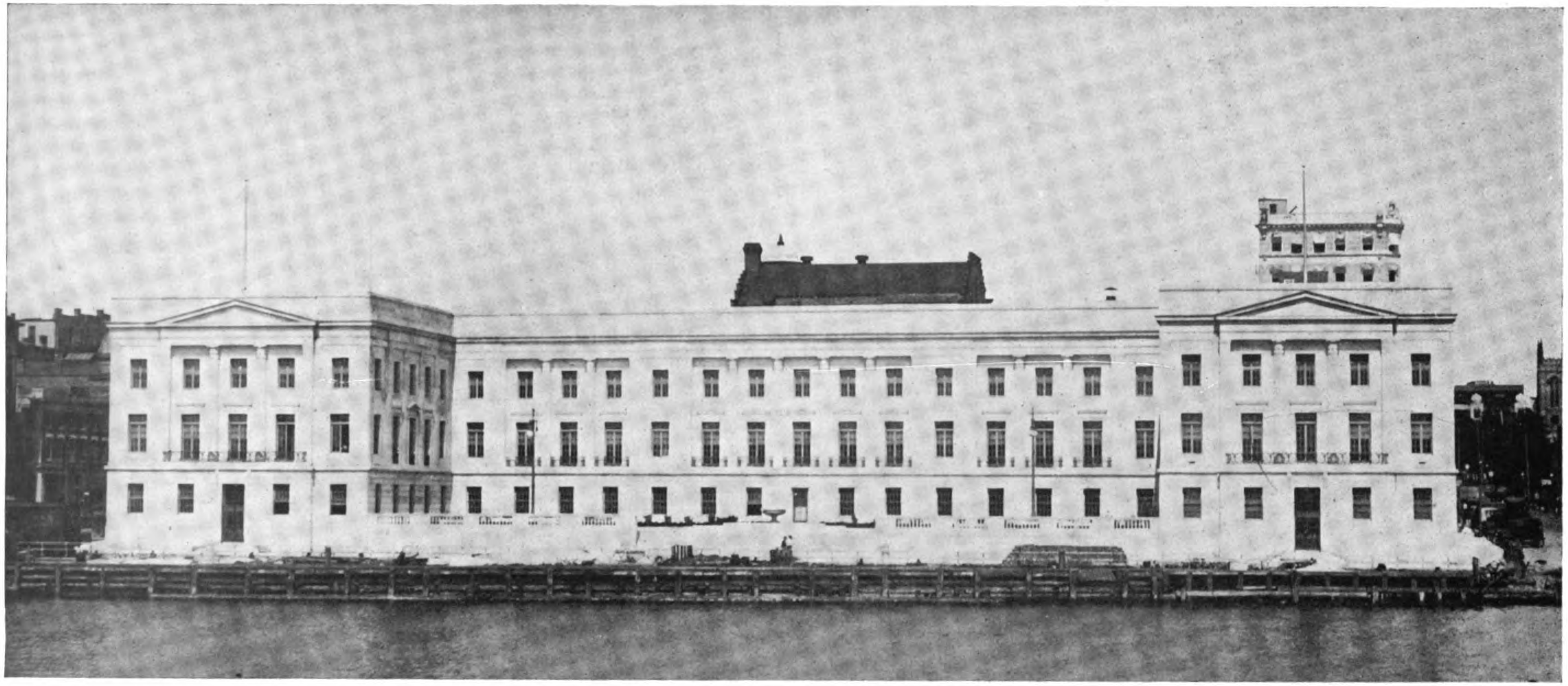
Ford, Bacon & Davis, Engineers.
A. Pearson Hoover, Lt.-Col. Q. M. C., Constructing Quartermaster.



SECTION TAKEN THROUGH WAREHOUSE CONNECTING PASSAGE AND WHARF SHOWING TRANSPORTATION FACILITIES, U. S. ARMY SUPPLY BASE, NEW ORLEANS, LA.

Ford, Bacon & Davis, Engineers.
A. Pearson Hoover, Lt.-Col. Q. M. C., Constructing Quartermaster.

Architecture and Building. Plate 12.
Built by George A. Fuller Company.

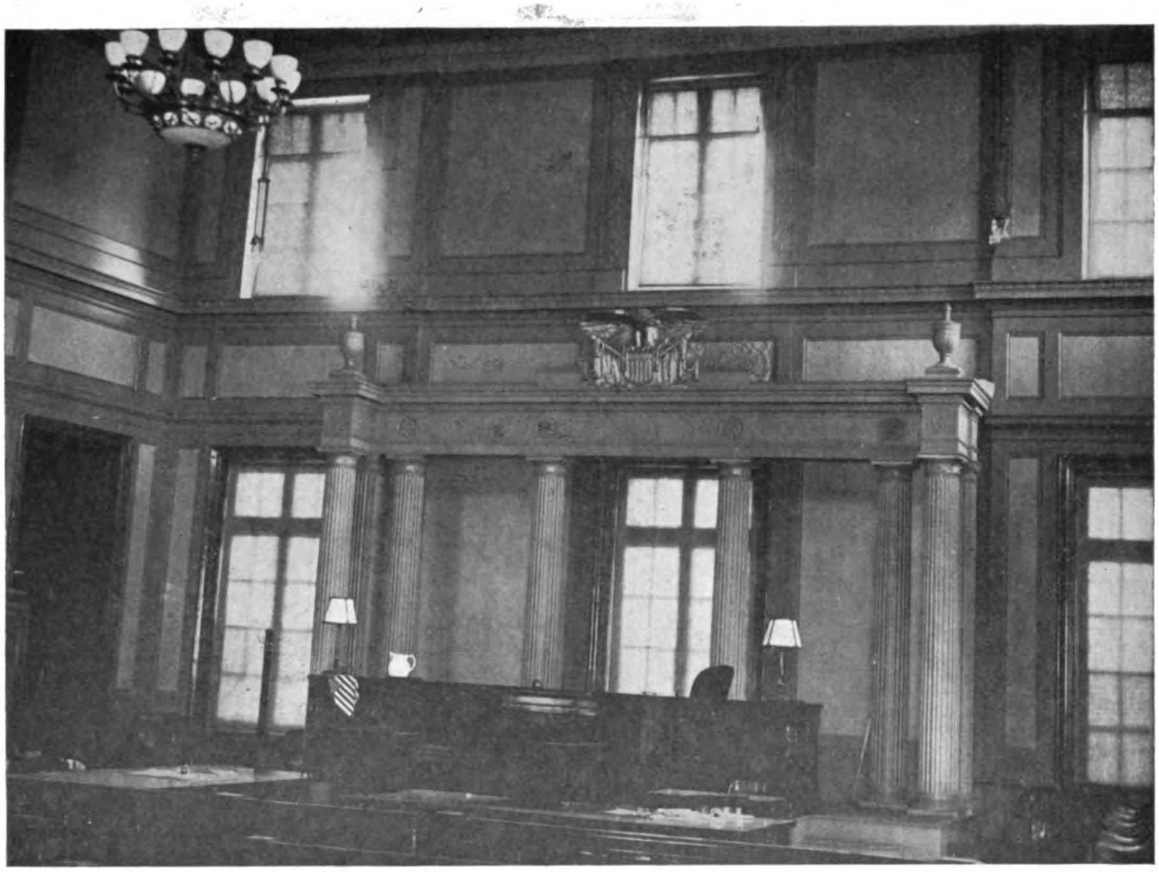


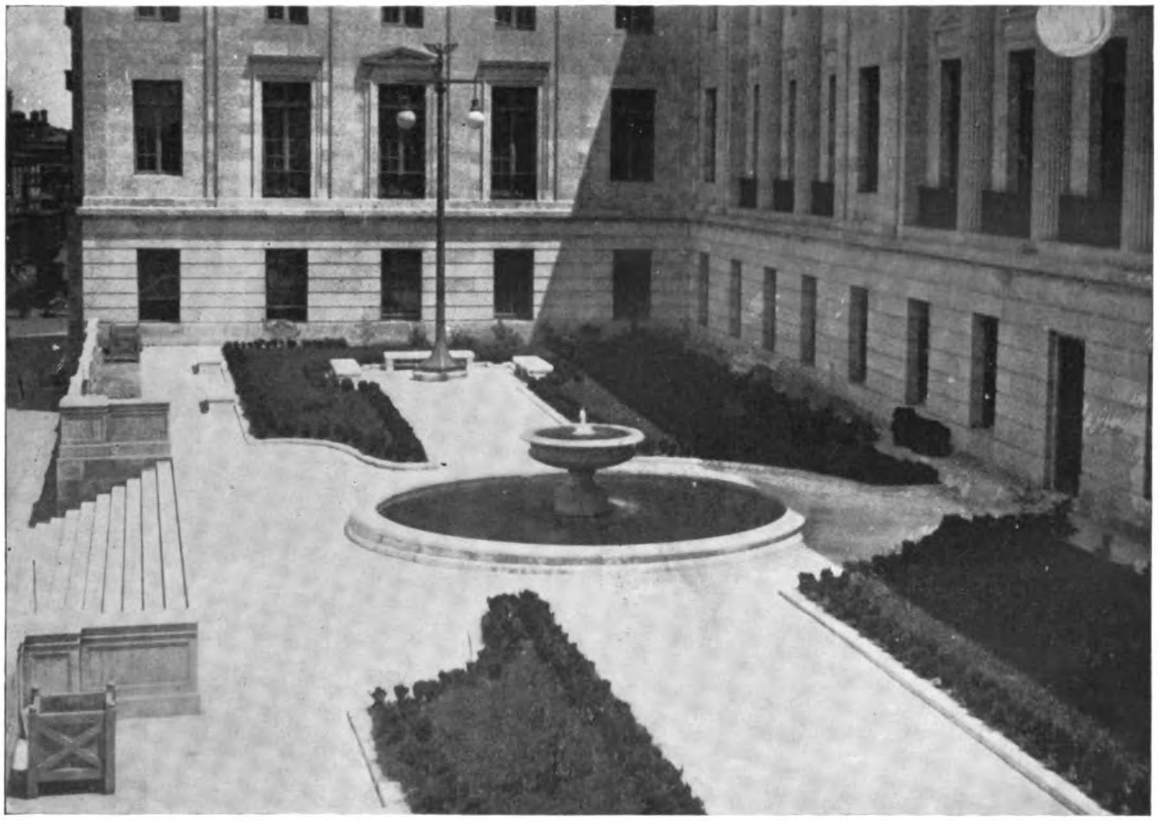
Architecture and Building. Plate 13.

Built by North-Eastern Construction Co.; directory and bulletin boards—U. S. Changeable Sign Co.; Edison Portland Cement used; door hangers—Richards-Wilcox Mfg. Co.; kalamein bronze windows and doors—Newark Cornice and Skylight Works.

U. S. CUSTOMS HOUSE, APPRAISERS' STORES AND COURT HOUSE BUILDING, WILMINGTON, N. C.

J. A. Wetmore, Architect.





COURT ROOM AND PLAZA IN FRONT OF ENTRANCE, U. S. CUSTOMS HOUSE, APPRAISERS' STORES AND COURT HOUSE BUILDING, WILMINGTON, N. C.

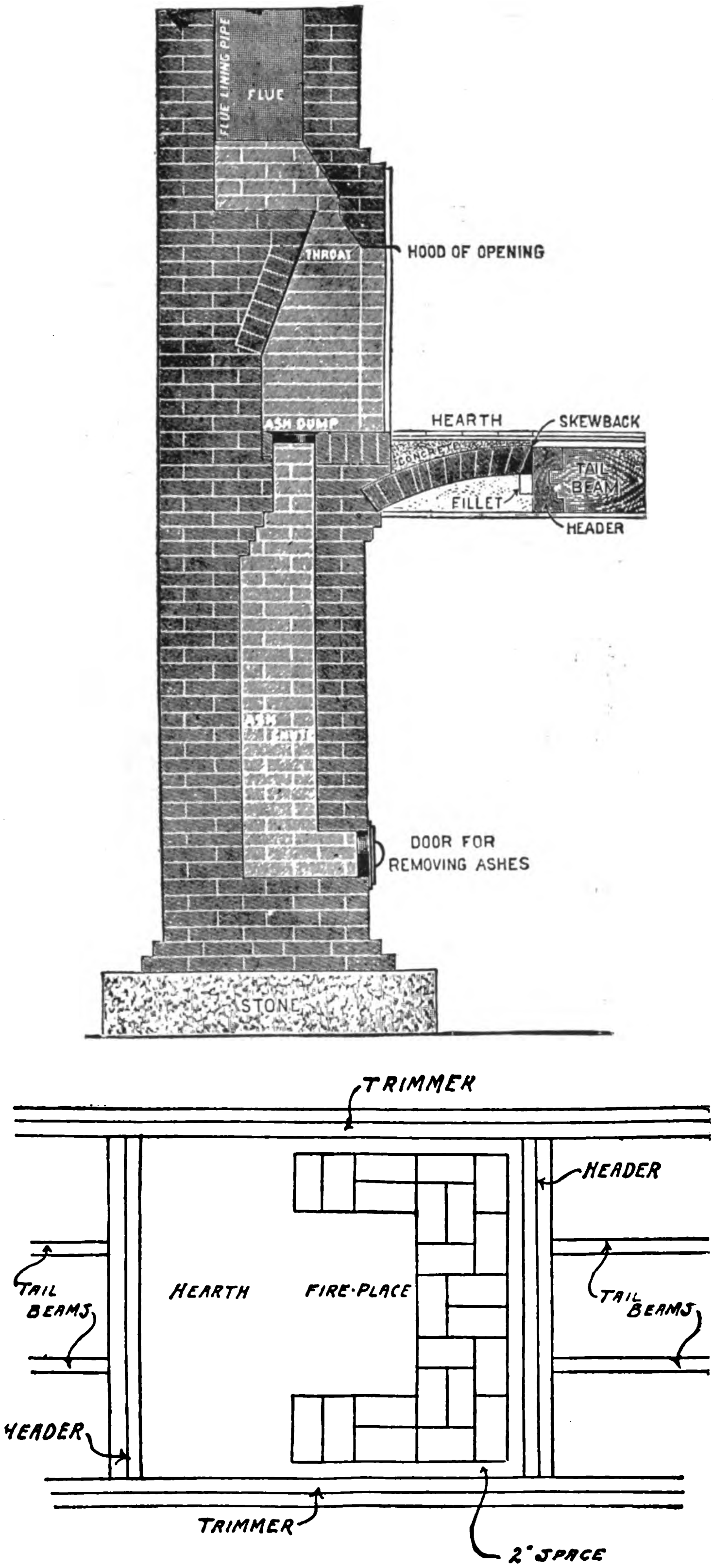
J. A. Wetmore, Architect.

Architecture and Building. Plate 14.

Built by North-Eastern Construction Co.; bronze work—Gorham Co.; chairs—Milwaukee Chair Co.; Queen casement window hardware—Grant Pulley and Hardware Co.

the flue dangerous at its hottest point, near the fireplace, especially if it be surrounded by only four inches of brickwork. Make sure that the flue lining is carried up from the throat of the fireplace.

Where flue linings are not provided be careful to see that all joints are struck smooth on the inside, and that projections of bricks or mortar are not allowed, and also that no parging nor plastering of the inside of the flue is permitted under any circumstances. The plastering is liable to fall afterward, under the influence of heat and rain, and not only stop up the flue, but tear out the plaster between the joints of the bricks. The flue lining will prove the cheapest in the end, for it will maintain a smooth throat and thus discourage nest-building by chimney swallows.



SECTION OF STANDARD CHIMNEY SHOWING TRIMMER ARCH UNDER HEARTH, PROPER CONSTRUCTION OF FIREPLACE, FLUE AND FLUE LINING, ASH CHUTE, ETC.

All flues in every building should be properly cleaned and all rubbish removed, and the flues left smooth on the inside upon the completion of the building.

If there is an old chimney in your house and you can feel great heat from the flue by putting your hand on the plaster in a room, then there is probably no lining in the flue and the walls are only four inches thick. Have the chimney examined. It may be that it is dangerous. A little piece of flooring taken up close to the flue will show at once whether or not the beams have been properly trimmed away from it. There are various ways to remove the danger. The beams can be temporarily supported from below, cut off short and a head piece trimmed in so as to remove the promixity of the wood from the flue; or the flue itself can be lined. In that case the brick front of the flue must first be cut out. Sometimes it is then impracticable to get a burned clay or terra-cotta lining inside of the old flue because it would reduce the area of the flue too much and seriously impede the draft. In these cases it is common to line the flue with sheet-iron pipe with well-locked joints, using at least No. 10 metal for the pipe. Such iron pipe can also be more easily shoved into place in an old house than terra cotta. After the lining is in place the brick front face of the flue should be relaid in Portland cement mortar.

6. Do not run floor joists or other woodwork into chimneys or flues nor allow wood casing, lathing or furring within two inches of chimneys. All spaces between the chimney and the wooden beams should be solidly filled with mortar, mineral wool, or other incombustible material.

Where the chimney breast over the fireplace or mantel is furred out and finished with lathe and plaster, only metal lath should be used. If the mantel is of wood, it should not project far enough to be blistered or ignited. Care should be exercised in its selection.

7. All floor timbers should be "trimmed" clear of the hearths and brick work of the chimney, so as not to be in contact with it at any point.

This is easily secured by what are known as "header" beams, carried in front of the fireplace and at least twenty inches from the chimney breast, supported by the "trimmer" beams, which enter the wall on each side of the chimney. (See illustration.) These should not approach the side of the chimney closer than four inches. The intervening "tail" beams, as they are called, are mortised into the header. Where more than three tail beams are framed into the header, however, it should be supported in iron stirrups by which the weight is carried on the trimmer beams without mortising into them by "tenon and tusk" joints, which sacrifice material and carrying capacity. In this way the floor beams are free of contact with chimney flues. All hearths should be laid on trimmer arches of brick or a reinforced concrete slab carried across from the chimney breast to the header beam already described, so that the hearth shall not rest upon or near wooden beams in any case. (See illustration.) The length of trimmer arches should not be less than the width of the chimney breasts nor their width less than twenty inches measured from the face of the chimney breasts.

8. Line fireplaces with fire brick or cast iron. If ash pits are provided, do not pile wood or rubbish against their doors in the basement. Keep free space around them so that ashes can be readily removed and also that coals cannot possibly come in contact with combustible material.

When a heater is placed in a fireplace the hearth should be the full width of the heater and the mantels should be non-combustible. Fireplaces should never be closed with a wood fire board; nor should a wood mantel or other woodwork be exposed back of a "summer piece"; the iron work of the latter should be placed against the brick or stone work of the fireplace.

9. Be careful of joints between stovepipes and flues, and use thimbles and connections in accordance with specifications and ordinances. If a stovepipe is taken down to be cleaned, be sure that it is replaced and plastered in as found.

A great many fires start at the point where stovepipe enters the flue. Stovepipes must never be allowed to come into contact with combustible material.

If a stovepipe should be placed in a room in which there is no smoke flue, and the stovepipe has to pass through a lath and plaster or wood partition to connect with one, great care is required to make it safe. This may be done by placing a smoke-pipe guard-casing (at least eight inches larger in diameter than the pipe) through the partition, perforated with holes in its ends. If the smoke-pipe should be connected to a furnace and heated to a high temperature, then the diameter of the guard-casing should be increased to a suitable size. The stovepipe should not be placed closer than six inches to woodwork, and at this distance it is always well to shield it. In all cases where metal is used to protect wood, there should be an air space between the metal and the woodwork to be protected.

10. After removing a stovepipe from a chimney, close the opening with a metal flue stop; if the flue connection is left open fire may communicate, and if it is closed by being stuffed full of rags or paper, the chances are that it will communicate.

11. Instructions for repairing old chimneys.

In order to ascertain if chimneys need rebuilding, climb to the top and look down inside. If mortar has fallen out from between the bricks on the inside, it will soon do so all the way through the wall. Take an ice pick or other sharp implement and try to push it through the mortar; if you can do so, rebuild at once, as follows:—

Where soft coal is used, it is necessary to rebuild the chimney tops every few years. Tear chimney down below the roof, get fire clay tiling of the same size as the inside measurements of the chimney, set it in top of the flue and build up with good hard brick laid in cement, consisting of two parts of sharp river sand and one part of good Portland cement. Mix and lay quickly before the cement hardens. This will make a solid brick, tile and cement chimney through the roof, where there is most danger, and is the best that can be done unless torn down to the ground and rebuilt, which is quite expensive and seldom necessary. Build the chimney up at least three feet above the peak of the roof.

Do not under any circumstances "top off" a chimney with tiling or metal, as they are soon destroyed by the sulphurous acid in the coal smoke, and either fall or are blown off, frequently damaging the roof. Build it all the way up with brick, tiling lined, as indicated above.

12. A chimney and flue ordinance has been prepared by the National Fire Protection Association, which covers the above recommendations, and is in proper form for adoption by municipal or state authorities. A draft of this ordinance can be obtained from the association at Boston, Mass.

FRANKLIN H. WENTWORTH.

"GRID" FLAT SLAB FLOOR SYSTEM.*

An engineer's position in a building department or other office where the work is largely of a supervisory or consulting nature has some of its compensations in other things than the financial return he receives for his work. He is able to keep abreast of the times, or even a little ahead of them, since all new types of construction and design must be approved by some authority before they are put on the market.

As construction engineer of the Boston building department for the past three years, I have met with many new wrinkles and ideas on concrete design, some merely interesting, some ludicrous, and some really useful.

Of all that I have had brought before me, one stands out in my mind, both as an engineer and as a practical construction man, as a really important step forward in concrete construction.

I refer to the "Grid" flat slab, invented and developed by Mr. E. F. Allbright of the Adams-Pond Co. of Boston. The Grid system consists of columns with column capitals, a solid slab projecting beyond the capital with cantilever effect, and a slab with recesses in the under side throughout the remainder of the bays or panels extending to the margins of the solid portions, the rib between the recesses being reinforced with bars near the bottom, and the solid portion over the columns being reinforced near the top. The recesses are obtained by the use of removable forms. These forms or pans are of sheet steel and are designed so as to permit of simple installation and of easy removal after the concrete has been cast in place.

The pans at present in use are 19" x 19" x 8" deep and they are placed approximately 24 inches on centers in both directions in the slab forming ribs 5 inches wide in both directions. It is designed by the use of the same moment coefficients as an ordinary flat slab and one may use the "Joint Committee" formulas, Chicago Code, or any other building law. The cubical contents of a 19" x 19" x 8" pan is that of a solid slab 24"x24"x4". There is no reason why the depth of these pans can not be less or greater than 8 inches so that a uniform saving on all spans may be made, and I understand that this is to be done.

This construction gives a ceiling with much the same appearance as the ordinary domestic waffle or grid-iron, hence the use of the name "Grid" flat slab. It was first presented for consideration by the inventor in 1917, when the design was in a preliminary stage, and an opinion was asked as to whether or not it would conform to our

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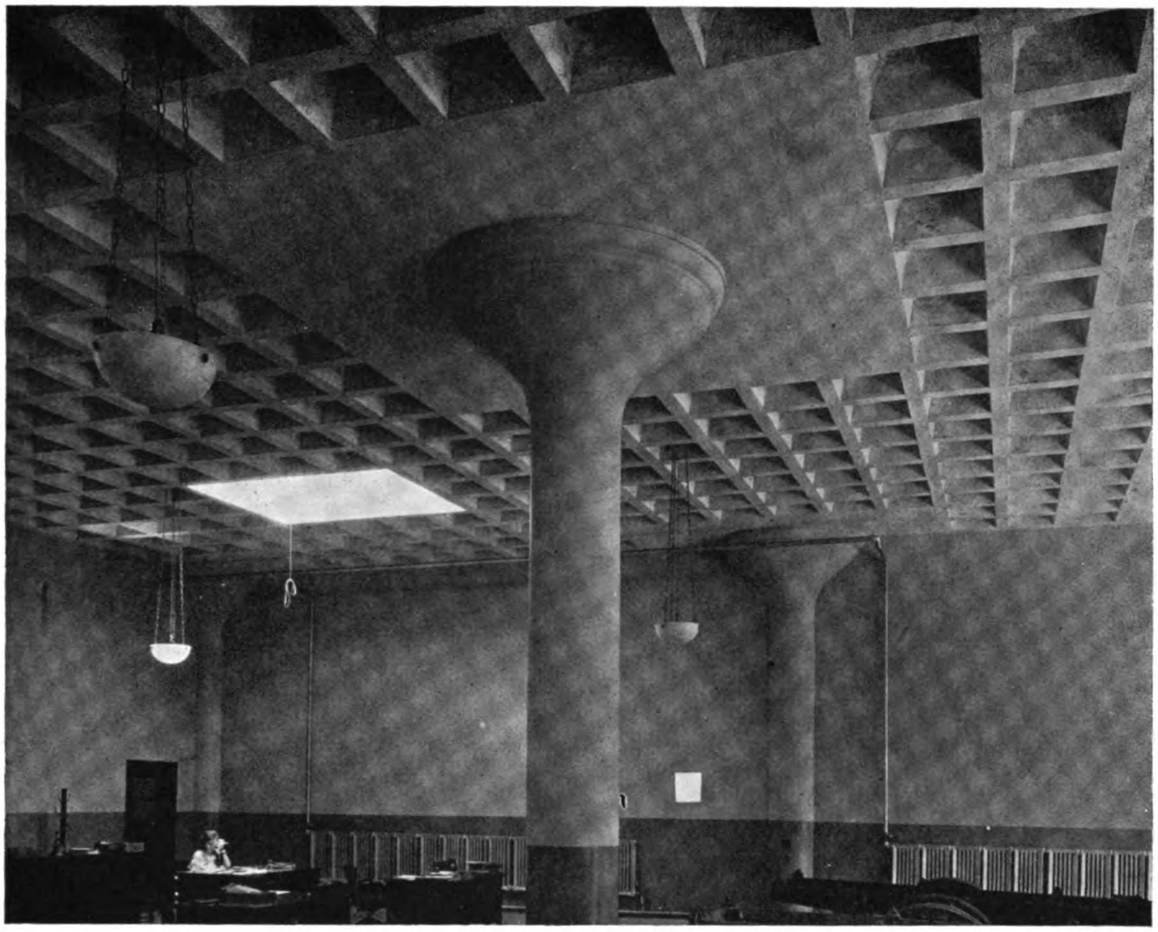
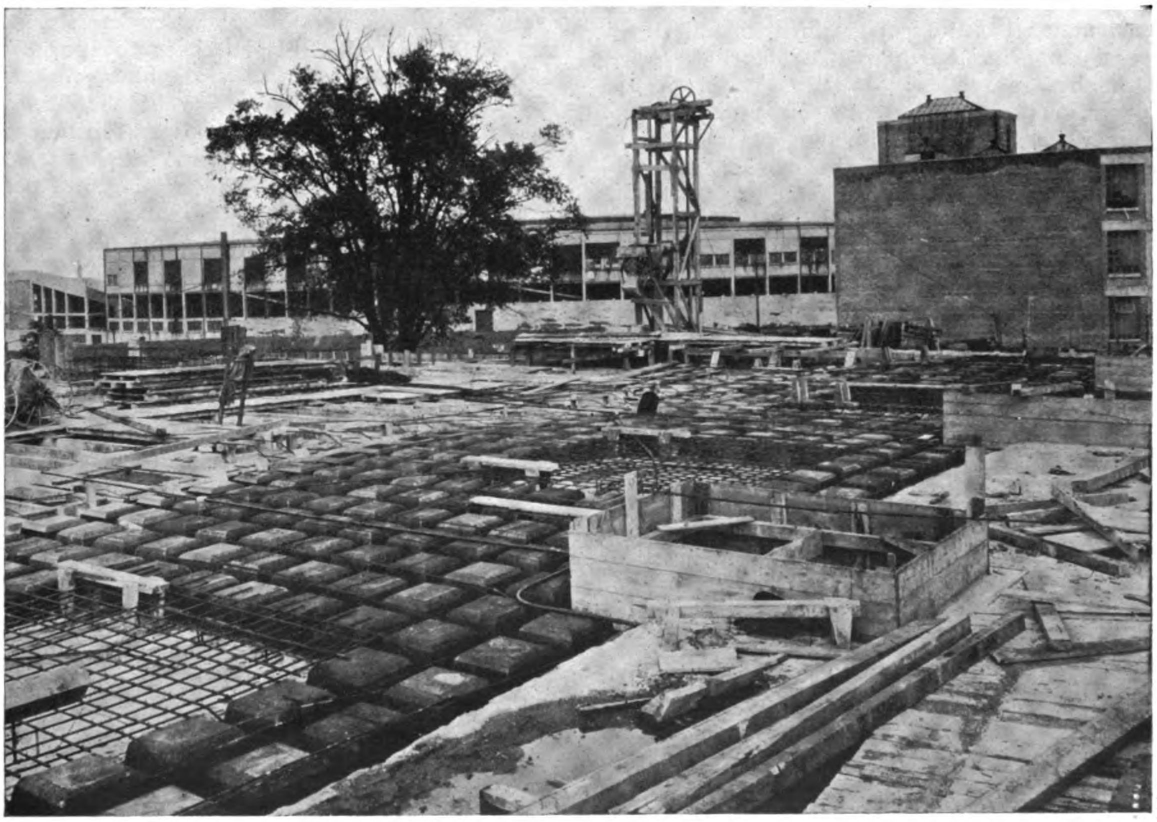
* By Walter L. Cronin, Construction Engineer, Boston Building Department, Boston, Mass.





HOLTZER CABOT ELECTRIC COMPANY'S BUILDING, BOSTON, MASS.
General contractors—Kearns Construction Company; "Grid" flat slab construction—DesLauriers Column Mould Co., Inc.

Building Laws and Regulations. After going into the matter carefully, particularly the compression in the ribs and the diagonal tension, I came to the conclusion that it would conform to all the Building Department requirements and would exceed many of them.

Since then, several buildings have been designed and built under this system and many more are now contemplated. From conversation I have had with architects and builders I believe that the many advantages of this system will lead to its wide use. The advantages particularly appealing to me as an engineer are:

1. Saving in the amount of concrete, which is from 20% to 35%.
2. Saving in steel, from 10% to 20%.
3. Increased stiffness in floors, owing to the great depth.
4. Saving in permanent dead weight of construction, which gives lighter columns and footings (a big item in pile foundation districts).
5. Increased spans owing to reduced slab weights (which make a 30′ x 30′ panel as economical as the present 22′ x 22′ panel).
6. Better engineering design as both steel and concrete are supplied only where needed.

There are savings and advantages which will appeal to the contractor and the business man which are as vital as the engineering details and these will tend to favor the use of this system. They are:

7. Lighter shores and saving in form cost.
8. Cutting down the percentage of labor per square foot of floor space.
9. More artistic buildings, doing away with monotonous flat ceilings.
10. Better sound deadening properties, which make it suitable for heavy manufacturing businesses.

The cost of building at the present time is high, though construction has not yet attained its full stride. Materials and labor are fairly well stabilized in price, though both show a tendency to rise slowly. When building operations get under way on a large scale there will inevitably be a shortage of common labor and materials. Any system which shows a saving in material and labor is bound to be a factor in keeping down the cost of construction, particularly when a better building is produced by this system, and it will be investigated by everyone interested in building operations.

The centering of this system is less costly than the ordinary flat slabs and the shoring used is lighter. Forms are erected in such a manner that the pans may be readily removed and reused without disturbing the shores which remain until the concrete has thoroughly set.

The most interesting example of the practical application of the "Grid" system that I have passed upon is the proposed new garage for the Electric Garage Trustees on West Dedham Street, Boston. This building is 235 feet by 90 feet consisting of a basement and one story and is especially designed for the use of electric-driven trucks. It will be equipped with a battery room and operating balcony, with apparatus for charging the trucks, and has a capacity of 150 vehicles, with the four entrances so arranged that each truck can be driven directly out of the building. The building is to be brick and concrete, and the "Grid" system application will make it possible to save much time in construction.

The basement bays are 30 feet square with the roof girders so arranged that only six interior columns are needed to support the 21,000 square feet of roof. The first floor spans are 30 feet. The total cost of the building, land and equipment will be about $250,000.

The floor is designed to stand a live load of 150 pounds per square foot, but as the contractors are anxious to test the merits of this new type of construction, a test will be made by J. R. Worcester & Co., consulting engineers.

The results of this test will be awaited with much interest as the large area, two 30′ x 30′ panels, will be loaded to 300 pounds per square foot, making a total test load of 540,000 pounds or 270 tons. Any slab which stands up under this enormous load will prove its practicability. This system is undoubtedly the best that has ever been presented to the building department of the city of Boston, and I believe that through its many merits it will become one of the most formidable designs ever presented to the building industry.

Walter L. Cronin.

Note:—The Des Lauriers Column Mould Company, Inc., of New York City, have taken over the exclusive patent rights covering the United States and Canada on this construction. This firm makes a specialty of steel mould construction for reinforced concrete and are equipped to supply the demand for steel moulds of every character.

THE CAPITOL THEATRE.

The Capitol Theatre building on the corner of 51st street has a Broadway frontage of 100 feet, extends down the street 269 feet and thence through to 50th street where it has a frontage of 157 feet. The auditorium is one of the largest in New York City, providing seats for 5,000 people. It has been the purpose of the designer throughout to so scale and proportion this interior that the enormous size of the house is not apparent and that the great voids and distances usually so characteristic of great opera houses are not the immediately impressive feature of the theatre interior. The theatre building is, in appearance, a six-story structure and the Broadway corner above the first story is used for office purposes. The entrance to the theatre is approximately at the centre of the Broadway front with two shops, one occupying the corner and the other (The Tiffin Shop) between the theatre entrance and the office building entrance. An ornamental iron canopy covers the approach to the theatre entrance and furnishes space for electrical display signs of the attractions. This iron work was done by A. Perlman Iron Works.

The grand lobby extends across the front part of the building immediately back of the foyer. This room, approximately 40x100 feet and of two-story height, is of highly ornamental character and contains the grand marble staircase which leads to the balcony floor. The auditorium and stage occupy a space 175x200 feet. The orchestra has a seating capacity for 2,750 people, the balcony, 2,100 and the boxes, 150, making a total of 5,000.

The construction of the auditorium presents several features unusual in so large an interior. The sight lines are uninterrupted by columns and the balcony is carried by cantilevers from a great truss which is said to be the largest ever used in interior building construction.

This is 170 feet in length, 16½ feet in depth and weighs more than 100 tons. It is supported above the orchestra by two heavy columns, set about 60 feet within the building line and has an unsupported span of nearly 160 feet. The cantilever trusses which support the main balcony spring from this truss and have a minimum length of 40 feet at the centre. The roof trusses, eleven in number, over the auditorium are 120 feet in span. Because of the conditions produced by the war, it is interesting to know that the laying out, cutting, punching and assembling of the steel for this extensive truss work was all done on the ground, instead of in the mill. The fabrication and erection of the steel was carried out under the direction of Paul Chapman, structural engineer.

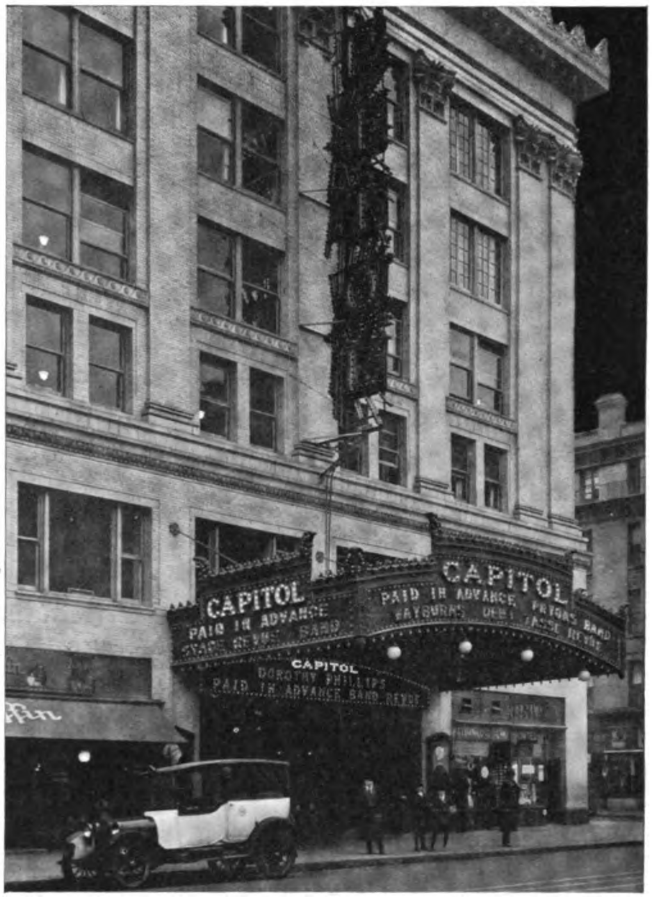
The proscenium opening and arch are built of reinforced concrete. The opening is 61 feet wide by 50 feet high and the supporting piers at either side are of reinforced concrete, 3 feet thick and 6 feet wide. The arch spanning the opening above this point consists of a great reinforced concrete wall 26 feet high and 3 feet thick forming a fire wall between the stage and the auditorium. Edison Portland cement was used in construction of all reinforced concrete work.

The decorations are in the Empire style and culminate in the grand lobby, which is conceded to be the architectural triumph of the building. The marble staircase which is its central feature is contrasted with the walnut paneling, cream and gold ceiling and the series of the five decorative panels which are the work of William Cotton. The general decorative scheme throughout the theatre is the work of Cooper, Sampietro and Gentiluomo. Emphasizing the decorative effects of the grand lobby are eleven French rock-crystal chandeliers which were produced in the studios of Black & Boyd Mfg. Company. The history of these is interesting, as they were formerly used in Sherry's and because of the scarcity of French rock-crystal, the fixtures at Sherry's were purchased and reassembled to conform to the requirement of the Capitol Theatre lobby.

The planning of the theatre provides for the seating of an orchestra of 70 pieces upon the stage immediately before the picture screen. The orchestra is supplemented by an Estey pipe organ of wonderful range and tone, being one of the finest ever installed in a building devoted to amusement purposes.

The use of marble in the Capitol Theatre calls for a word of comment. This work was executed by John H. Shipway & Bro. The vestibule of the main entrance is finished in the new Italian monotone marble (Savoy Claire) lately introduced by Pisani Brothers, marble importers. This new monotone marble has been extensively used in many of the new Government buildings in Rome, Italy, and we understand it can be obtained in large quantities and in blocks of almost any size. It is of a light buff color with some shell formation which gives this material some character. The railing and bases of the orchestra story are also made of this Savoy Claire as well as the pilasters. The main stairway is built of the well-known Carrara statuary vein, a material of great merit and distinction, having particularly fine texture and great decorative quality because of its uniformity of color and markings. This marble is a product of the quarries of Pisani Figli Company, of which Pisani Bros. are the American representatives.

The building was designed by Thomas W. Lamb and built by the O'Day Construction Company, Inc. R. D. Kimball Company were the consulting engineers. The Edwards Electrical Construction Company were the electrical contractors. The interior cove lighting, border and footlights as well as the Max ell flood lights on the exterior were supplied by the New York Calcium Light Company. The moving picture machines, spot lights and screen were furnished by B. F. Porter and the Precision Machine Company made the picture machines. One of the features of novelty in the stage mechanism are the revolving stairways which, together with other stage scenery, were made by the T. B. McDonald Construction Co. The stage scenery was painted by the Lee Lash Company and the stage rigging and asbestos curtain were made by William Camph.



Max ell flood lights—New York Calcium Light Co.; electric power furnished by United Electric Light and Power Co.

The sprinkler system was installed by the Raisler Sprinkler Company. To provide adequate protection against the catastrophe of fire, the premises is equipped with the nationally known A. D. T. System of Night watch and fire alarm service, furnished by the National District Telegraph Company of New York. The system consist of a large number of fire alarm boxes placed at convenient locations throughout the premises over which, by the simple operation of pulling a lever, signals of alarm may be instantly transmitted over electric wires to Fire Department Headquarters, thus bringing the department quickly to the scene. By the same system the watchmen are required to punctually and regularly signal the Central Operating Office of the District Company as they make their rounds of the various parts of the building.

Charles H. Darmstadt., Inc., were the plumbing contractors and the Superior Standard Automatic stage ventilators are installed, as well as Knowles mushroom ventilators in the auditorium. The seats were supplied by the American Seating Company. The draperies, curtains and furniture were supplied by Freeman Bros., Inc. Richards & Wilcox Mfg. Co. supplied the "Ideal" elevator door hangers and the hardwood flooring was installed by the Indiana Flooring Company. The ticket selling devices are of interest. There are four 4-unit automatic ticket registers together with the automatic ticket destroyers or choppers. These machines were supplied by the Automatic Ticket Selling & Cash Register Company.

The Tiffin Shop in the Capitol Theatre building is unique in the fact that it represents a distinct change in the general character of interior decoration. Tiffany Favrile glass tiles are not new, for they have been manufactured for some years by the Tiffany Furnaces at Corona, L. I., and used by Mr. Louis C. Tiffany in connection with much of his work. However, the architect, Mr. Petit, has used them fearlessly in his work in the Tiffin Shop, and it is the first time in which they have been used *en masse*. The tiles themselves are of a general blue tone, with a reflective iridescent surface. Incorporated in the general scheme are tiles embossed with designs suggesting somewhat of the Persian or Moresque feeling. The architectural details are brought out by creating a matt black design on a blue field. The tiling is set to an average height of about five feet with a series of stepped effects. On each step is mounted an individual lamp giving a subdued light of a purely decorative character.

In frames directly above the tile wainscot and between each tier of lamps, are illuminated panels of Favrile-fabrique glass. This is another production of the Tiffany Furnaces. These panels represent silk so perfectly that it is only by touching them that one realizes they are glass.

On the ceiling and in the windows are specially designed lighting fixtures of Tiffany Favrile glass. These fixtures are of a character wherein metal is used only where necessary to support the glass units and house the electrical connections. The Tiffany Furnaces are exponents of the idea of utilizing the glass element for lighting fixtures almost entirely and reducing the metal element to the merest necessary details to meet constructive requirements.

The effect of the entire scheme is remarkable for its wonderful richness and rather weird color effects. It cannot be given a name as regards any particular style, more Persian than anything else, perhaps.

Righter & Kolb were the decorators employed for this shop and The Reischman Company supplied the tables and chairs.

NEW ORLEANS ARMY SUPPLY BASE.

Located on the Mississippi River on the outskirts of the City of New Orleans and immediately adjoining the mouth of the Inner Harbor Navigation Canal where it enters the river, the U. S. Government built the long wharf and the three warehouses which comprise the supply base for the southern zone, known as the New Orleans Army Supply Base. The construction of this project was carried out under the direction of the Construction Division of the Army and under the immediate supervision of Lieut.-Colonel A. Pearson Hoover, Constructing Quartermaster. Ford, Bacon & Davis were the supervising engineers employed by the Government and the George A. Fuller Company were the general contractors for the warehouses and connecting bridges, while Hollbrook, Cabot & Rollins Corporation held a sub-contract for the erection of the wharf and wharf house. The entire control of the work, however, was in the hands of the Government represented by the Constructing Quartermaster who had full responsibility for the direction and supervision of the work. This project was long delayed at the start and little was done for many months until Lieut.-Colonel Hoover took charge; thereafter rapid progress was made and some remarkable records set in form erection, the pouring of concrete and general work, as well as in low unit cost.

The buildings consist of three units, six stories high, 140 feet wide by 600 feet long. Fire walls divide each building into three sections, each 200 feet in length. There are six freight elevators, centrally placed in the middle section of each building and two passenger elevators located in an adjoining section of each building. The buildings front on Dauphine street and there are team platforms at both ends. Railroad tracks extend along the side platforms.

The wharf is 2,040 feet in length and 171 feet in width. It has a two-story wharf house 2,000 feet in length divided into ten sections of 200 feet each, the width being 140 feet. There is a freight elevator in every other section of the wharf making five in all and nine fire walls divide the sections. A trestle providing three tracks runs the entire length of the inner side of the wharf. Three connecting bridges extend between the wharf house and the warehouse units. The first bridge connects both stories of the wharf with the first four stories of warehouse No. 1 and the other two bridges connect the second story of the wharf with the third and fourth stories of the other two warehouse units. The wharf is also connected by means of a trestle with the roadway so that it has a team entrance. The Government includes within its reservation about the buildings a large car storage area providing for a total storage capacity of 743 cars at a time and the switching facilities are such that shifting can be rapidly accomplished and cars placed without congestion.

The warehouses are of uniform design and have the following loading capacity for the various floors:

1st floor—400 pounds per square foot.
2nd floor—350 pounds per square foot.
3rd floor—250 pounds per square foot.
4th floor—250 pounds per square foot.
5th floor—250 pounds per square foot.
6th floor—250 pounds per square foot.
Roof—25 pounds per square foot.

The story heights, floor to floor, are 14 feet 6 inches in the first and 11 feet 6 inches in all stories above. The bays are symmetrically designed and the column spacing throughout is 20 feet centre to centre. The construction is reinforced concrete throughout.

The wharf is built on creosoted piles with substructure and floor of creosoted lumber. The wharf house is of steel construction, the column footings being of reinforced concrete resting on grouped piles. The fire walls are also of reinforced concrete. A double wood flooring and wood roofing are used.

Because of the alluvial deposits and sand stratum underlying the site, pile footings were necessary for all of the building foundations. The piles were driven to give a total penetration of approximately 51 feet. Under warehouses 1 and 3, untreated wood piles approximately 11,000 for each foundation were used. Each pile carrying a dead load of 12 tons and 85 per cent. of the total live load. For the footing of warehouse No. 2 the Raymond composite pile was used consisting of a lower section of untreated timber 48 feet in length and an upper section of concrete 8 feet in length. These piles were designed to sustain 16 tons and through their use the excavation for the footing of warehouse No. 2 was eliminated and a continuous mat forming the first floor was poured upon the ground without form work other than bulk heads surrounding the site to retain the concrete. There is therefore no open space below this floor. On the other two buildings the piles were cut off below low water level and concrete grillage footings form the bases for the columns. Form work was necessary for the construction of the first floor slab. The type of foundation used in warehouse No. 2 made possible the completion of this building but a few days behind warehouse No. 3, although its construction was started more than a month later.

The total storage space of the three warehouses is 35 acres and of the two-story wharf house 13 acres, making a total of 48 acres and the total storage capacity of the plant is approximately 178,000 tons of material. The length of the wharf is supposed to accommodate from five to eight ships, varying from 5,000 to 12,000 tons capacity. The trackage adjoining the loading platforms of the warehouses and wharf house has a total capacity of 183 cars. The design of this entire group is such that it is not only most efficient for army use but is also a practical commercial proposition from a warehousing standpoint. The facilities afforded for the handling of material within the units are as efficient as those provided for receiving and shipping directly from the common carriers. The buildings and wharf are all provided with storage battery rooms for the maintenance and charging of electric trucks and these provide direct and rapid communication throughout the levels of the wharf house and into all of the warehouses through the connecting bridges. The arrangement is such that the use of elevators is unnecessary for the handling of material between both levels of the wharf house and the first four stories of warehouse No. 1 and between the second story of the wharf house and the third and fourth stories of warehouse Nos. 2 and 3. The freight elevators are of 10,000 tons capacity throughout and have a platform area of 785 square feet with a speed of 150 feet per minute. Continuous platforms 21 feet wide surround every unit at the first floor level. These platforms open into the building at every bay, Kinnear revolving steel doors being provided to close the opening. The platforms are covered by a continuous canopy built of reinforced concrete extending to the edge so that unloading and loading of cars can be carried on under all conditions of weather.

The concrete floor surfaces throughout the buildings were finished by the Builders Material Supply Company, the process consisting of troweling the surface to a smooth finish, rich in cement and then covering with wet saw dust for a sufficient time to obtain complete hydration and setting of the cement. This process gives hard dustless floor surfaces, integraled with the floor slab without further finish.

The buildings and wharf house are equipped with an automatic sprinkler system throughout, each of the sections of each building being handled as a separate unit operating independently from any other. An underground feed pipe system connects this sprinkler service with the city main; 16 and 12 inch pipe are used for the main lines and 8 inch pipe for the feeders. Three 50,000-gallon tanks placed 25 feet above the roofs of each warehouse maintain a constant pressure upon the system. The Globe Automatic Sprinkler Company installed the sprinkler equipment in warehouse No. 3 and the wharf house. The National Cast Iron Pipe Company supplied cast iron water pipe and fittings.

The electrical installation consists of a transformer house which reduces the voltage from 6,600 to 440 3 phase for power and 110 and 220 single phase for lighting. The lighting is by 100 watt lamps located in the centre of the ceiling panels, approximately 20 feet centre to centre throughout. Provision is also made for many outlets for 1,000 watt flood lights for exterior use. Power outlets are also placed at frequent intervals for the use of conveyor machinery and winches of all types. Motors both for elevators and for general power purposes were supplied by the Westinghouse Electric Mfg. Company and the Houghton Elevator & Machine Company installed the elevators in unit No. 1 and the wharf house, and the automatic door operating machines which control the Peelle counterbalance doors at all of the freight elevator openings.

NEW YORK STATE INCOME TAX RELATING TO BUILDING.

Building contracts mean bigger revenue for New York State. As contracts are let the architect, the mason, the contractor and the plumber become active, and the result of such activity is going to mean income to those doing the work, and thus the state in turn will receive its share from every one earning such income. With the excise revenue cut off, the state must raise funds, and so the architect, the mason, the contractor and the plumber are called upon to assist in making up the deficit which the state will experience unless additional revenue is obtained.

The first duty of the contractor is to ascertain his gross income, and he is able to do this by adding together all income which he receives, such as proceeds of contracts, interest on bank deposits and profits received on the sale of materials. There are certain receipts which the contractor receives which are not to be considered as income, such as proceeds of life insurance policies, gifts and bequests, interest on obligations of the United States Government, salary received from the United States Government and money received as the result of the Workmen's Compensation Act. These items are not to be included in gross income.

From his gross income the contractor may deduct his ordinary business expenses, such as labor, cost of supplies and insurance taken out on his stock, taxes paid to the city, state or Federal Government, other than income taxes; he may charge off bad debts, and he may deduct any loss sustained in a business entered into for gain or profit.

The contractor is allowed a further deduction for depreciation where his fixtures or equipment has depreciated during the year. The depreciation charge should be spread out over the life of the equipment so that each year an aliquot part of the value will be charged off.

When business expenses and depreciation charges have been deducted from gross income we arrive at net income, and it is at this point that the contractor determines whether or not he is required to make a return and pay a tax. If single and he has a net income of $1,000 he must make a return. If married and he has a net income of $2,000 he must make a return. From the net income the personal exemption is deducted. In the case of a single man it is $1,000, and in the case of a married man or the head of a family it is $2,000, and an additional exemption of $200 is allowed for each dependent child under eighteen years of age and for each individual financially dependent on the taxpayer physically or mentally incapitated from earning a livelihood.

When the personal exemption is deducted from net income we reach the taxpayer's income, and it is at this point the tax is levied—the rate being one per cent on the first $10,000, two per cent on the next $40,000 and three per cent on all sums in excess of $50,000 of taxable income.

Let us assume a case where a contractor has a gross income of $20,000, business expenses of $8,000, depreciation charge of $1,000; he is married and has one dependent child under eighteen years of age. From the $20,000 gross income we deduct his business expenses of $8,000 and depreciation charge of $1,000, which leaves net income of $11,000. From net income we subtract $2,200 personal exemption, which leaves $8,800, the taxpayer's income, and as the tax rate is one per cent on the first $10,000 of taxpayer's income, obviously the tax will be $88.

Book Reviews

APPLIED SCIENCE FOR WOODWORKERS. By W. H. Dooley, New York; The Ronald Press Company. 7¼ x 4¾ inches, 457 Pages, numerous illustrations. Cloth. Price, $2.00.

This remarkably interesting text book presents the principles of chemistry, physics and biology as actually applied to work. Our usual text books which deal with mechanics, physics, chemistry, etc., deal with the abstract principles involved with usually very slight reference to the applications of the principles to technical and industrial production. In trade schools practise is the paramount issue and theory is only valuable in that it may further strengthen the student's knowledge and make him a more valuable workman at his trade. To reach a high standard of skilled workmanship a knowledge of scientific principles involved in the action undertaken is necessary and it has been the aim of the author of this book to graphically bring the scientific principles before the student while he is performing the operations with his hands. It is relatively easy to study scientific principles in the abstract and considerably more difficult to recognize these principles in operation in the ordinary day's work and it is to bring home to the student this last that the author has devoted his energy. This book is intended particularly for manual training students who will become woodworkers and for that reason the last six or seven chapters are particularly written with that end in view. However, the first thirty chapters are of much more general application and would be suitable for instruction in many lines. The book is extensively illustrated and the illustrations are of a very valuable character in that they show the application of scientific principles to ordinary mechanical devices in common use. Every chapter is provided with a series of questions at the end which are so drawn as to develop the information the student has obtained through the reading of the text.

A pamphlet entitled "Checking Schedule for Projected School Buildings," written by James O. Betelle, has just been issued by the Bruce Publishing Company. The intent is to provide a memorandum for school boards so that they can summarize their requirements for a new school building and put them in proper form for discussion before calling in the services of the architect. If this schedule is used for the purpose it is intended, it should save a great deal of time for all concerned with a new school structure. Part I is so drafted as to bring out all the information that the architect necessarily needs from a school board to start upon his plans and specifications. Part II is written to assist the building committee on checking up the finished plans and specifications as prepared by the architect. As in most communities school buildings are not constructed so frequently that there are many people familiar with the construction who would be apt to be on a school board, this pamphlet should be of great advantage, especially coming from so experienced a practitioner as Mr. Betelle.

STOP BURNING UP HOMES.

The housing problem is one of the great issues of the day. All unnecessary construction was forbidden during the war, and now that the restrictions have been withdrawn the high prices of materials and labor and industrial troubles have tended to reduce the amount of building. In many industrial centers newcomers are unable to get houses to live in, rents have gone up, and the situation has become so serious that state and municipal commissions are seeking a solution.

Why not stop burning up the existing buildings, if there are not enough to go around and more cannot be built under existing conditions? Thousands of homes are burned each month, most of them through carelessness. If housing is so important, if homes are so hard to find, why not be careful with those that we have? Apply five prevention methods. Be careful about matches, smoking, lighting and heating apparatus and gasoline. Clear out the rubbish, inspect the flues, watch the shingle roofs. Conservation is the order of the day, and if the shortage of dwellings will cause householders to be careful about the fire hazards of their homes one criminal cause of that shortage will be greatly reduced.

February

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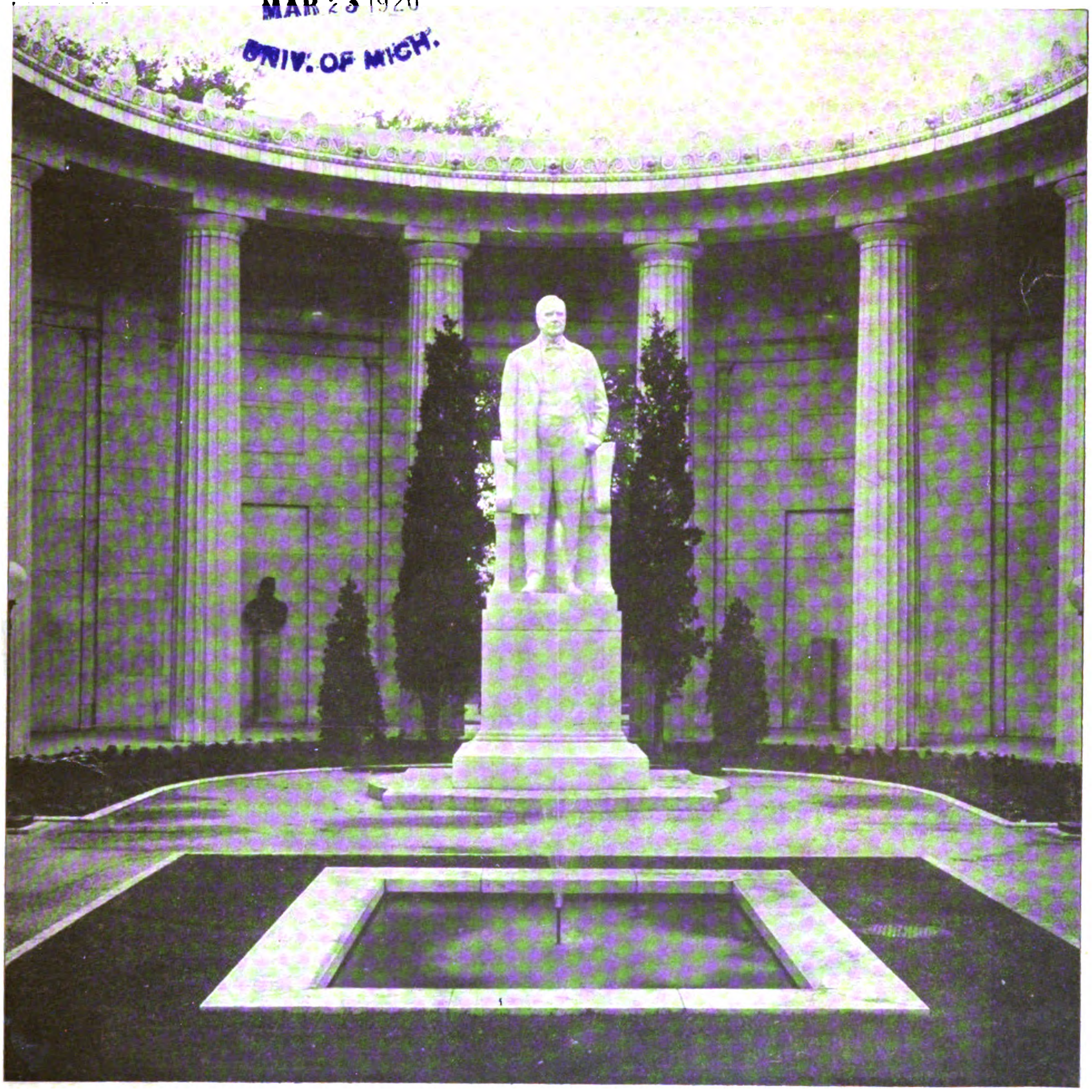

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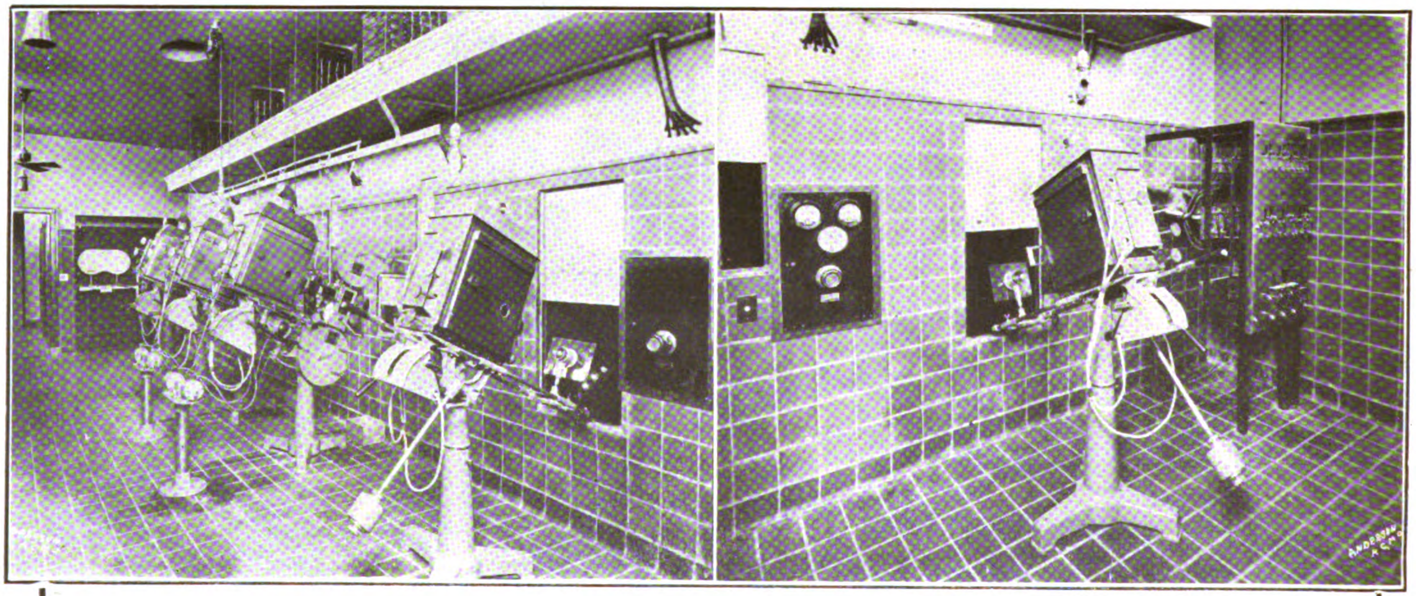

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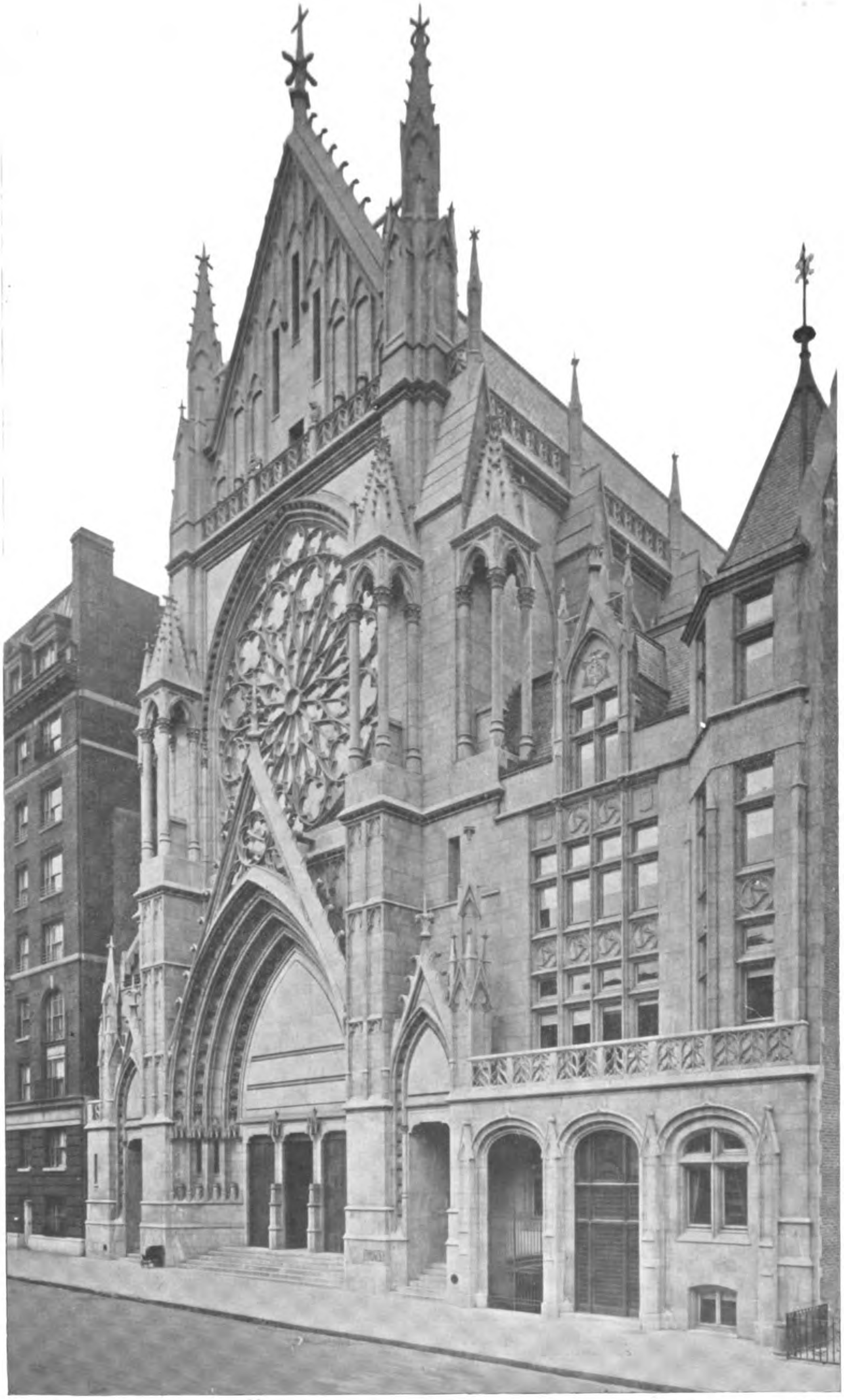

CHURCH OF THE BLESSED SACRAMENT, 70TH TO 71ST STREETS, NEAR BROADWAY, NEW YORK CITY.

Gustave E. Steinback, Architect.

Built by John T. Brady Co.; cut cast stone—Benedict Stone Corp.

ARCHITECTURE AND BUILDING

A Magazine Devoted to Contemporary Architectural Construction

WILLIAM P. COMSTOCK
Managing Editor

Volume LII FEBRUARY, 1920 Number 2

WINDMILLS, PICTURESQUE AND HISTORIC: THE MOTORS OF THE PAST.*

The pessimist says that man is a lazy animal and that he invents machines to save himself work. The optimist, that man is an industrious creature who invents machines that he may accomplish more. Whichever doctrine is right, there is but little question that of all the ingenious contrivances evolved by man none is more picturesque, of more historic interest nor of greater usefulness in its day than the old-fashioned windmill, the world's principal motor for some eight hundred years. And "motor" is the viewpoint to take of this old piece of mechanism, for just as the later devices of steam, electricty or gasoline are for the purposes of making power for the needs of man, so was this old appliance for the prime purpose of securing power from the wind, and by thus harnessing that most widely distributed of Nature's forces, of enabling the accomplishment of work far beyond the limits of manual power.

The steam engine came into use in the early part of the nineteenth century. By 1825 most of the principal English cities had it in use. Before that period, and dating back to remote ages, the only sources of power—other than man or bullocks, etc.—were the two great forces of wind and water. But only countries of waterways and varying levels afforded waterfalls; while the wind was universal. Therefore, while water wheels were in use in parallel periods with the oldest of windmills, in number they were infinitely less, so that one can properly say that the world's motor for some eight centuries was the old-time windmill. These eight centuries are from about 1000 to 1825, when, with the advent of Watt's invention, the zenith of windmill design and use had been attained. After that date they so declined that in fifty years not only had new construction ceased, but the old structures in very large measure had fallen into decay and abandonment. It is evident from the above that an account of this old, picturesque, historic and effective tool of mankind should have some interest, both from the standpoint of engineering and that of sentiment; and it is believed that what follows will give the essential facts relating to it. It may be proper to say here that what is related applies entirely to the old-style windmill, and in no measure whatever to the modern American type of windmill, which, while cheap, effective and useful, is nevertheless a prosaic, galvanized iron, squeaky thing, of which happily the larger proportion of the millions annually made is exported out of our country!

While the antiquity of windmills is traced by some back to the Romans there is really nothing very definitely known of their existence before the period of the Crusaders. They were said to have been brought into central Europe in that period from the Far East; though this is open to question. Practically their origin is lost in antiquity, and we only know that they appear in the earliest records as existent in some form or other.

But by 1200 they were well established. The first English windmill is of 1191. There are numerous records of them in the thirteenth century. There is a brass tablet of 1349 at Lynn church, with a windmill graven on it. In old stained glass of the early churches windmills are shown in some of the landscapes; as at Great Greenford and Fairfield. In a view, "London in the time of the Tudors" 1560), windmills are seen; and Great Windmill Street commemorates to this day the location of one in the past in that city. Elsewhere it was the same. Rembrandt, of the early part of the seventeenth century, shows such mills in some of his pictures; and in the early prints and views of France, Germany, and other countries is abundant evidence of the use of these old, useful machines, in various forms, places and ways.

What was standard in the old world was naturally brought into the new, and so we find in America, concurrent with the colonies and settlements of the early days, the introduction and use of windmills. The Dutch in New Amsterdam, in 1625 and later; the Swedes on the Delaware, in 1643; the English in Rhode Island, in 1665 and 1675, and Boston, in 1660; and on the Carolina coast—all had their mills, as shown by early records, maps and views. And these mills were logically the types used by the respective settlers, according to the district from which they had come. For instance, the old mill in Somerville, Mass., built in 1710 by Jean Mallet, a French Huguenot, is of the pure French type; as were those near Detroit, by the followers of the fortunes of Cadillac; while those in Talbot, Kent and Dorset counties, Maryland, reflected the clear English design of the old country. The same applies to the numerous ones erected in the colonial days of 1725 to 1775, in Easthampton, Bridgehampton, etc., on Long Island; at various points on Cape Cod; at Nantucket (1746); in numerous instances on Newport Island, Rhode Island, etc. A notable one of this type and period was that on Windmill Island in the Delaware River, shown in an old view, "An east prospect of the City of Philadelphia," 1746. All these reflected the English design of the emigrant settlers, bringing with them and promptly setting up and using the motors or machinery of the mother country.

There are two forms into which these old mills can be grouped, viz., vertical and horizontal. By that is meant the relative position of the wheel and shaft. The vertical is that form in which the wheel is vertical, mounted on a shaft which is horizontal or nearly so. This is the form almost universal, for while various instances of the other have been tried, scarcely one in a thousand has been used compared with the vertical type. The reason for this is that in the vertical form of wheel, its face directly confronting the wind, all vanes are acted upon at once, and there is not only the greatest resulting power, but the greatest simplicity of construction and of operation and handling. The horizontal wheel, on the other hand, occupying a horizontal zone and attached to a shaft that is vertical, like the usual small water turbine, in postion (but not in the fluid impact) receives the wind impact upon only some of the vanes at a time—not the whole circumference—with less proportional power and greater complexity of construction. So secondary has been the use of this style of windmill that consideration of it is negligible.

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* Presented at a meeting of the Mechanical and Engineering Section of the Franklin Institute of The State of Pennsylvania, Philadelphia, held Thursday, March 14th., 1918, by F. H. Shelton, Member of the Institute. Reprinted from the Journal of The Franklin Institute by courtesy.

From the design standpoint, windmills involve four essential component parts:

(a) A tower, or means of support for the moving wheel and mechanism.

(b) A revolving wheel that receives the impact of the wind, converting it into power.

(c) Some means of turning the wheel, to follow the shifting of the wind; and.

(d) The driven machinery.

(A) The Towers or Supports.—The support in the earliest form of mill was merely a post, made of a suitable log or tree trunk—sometimes 30 inches thick—upon which the entire structure was carried or hung and pivoted, so that it could turn freely to the wind. This was the original type—the old "post-mill," appearing in the earliest known prints and records, and alone used until about 1650. At that time the "tower mill" was developed, and this, of larger possibilities, soon resulted in great structures of that style being built, that generally replaced and threw far into the shade the earlier and simple post form.

The towers of this latter form of old windmill were made of every conceivable or possible form and material. Straight or cylindrical; tapering or cone shaped; octagonal or multi-sided; even bottle shaped, like a mammoth milk bottle of the present time. Again, on open arches, as in two notable structures later referred to—anything to carry the overhead work, according to the fancy or purse or conditions governing the builder. Of brick or stone or wood; slate shingle or thatch covered, in height these towers ranged from 25 to 100 feet. The largest ever built was at Great Yarmouth, England, 11 stories high, and over 100 feet, exclusive of the great vanes. The great Dutch grist mills were however, a close second in height, and with a base of some 35 feet and a top width of 16 feet were massive structures indeed. These tall structures were divided by various floor levels, the lower rooms thus formed containing the mill-stones or saw or other driven machinery, while the upper ones were used for living quarters or storage. The structure of the smaller post mills, however, being suspended on the center posts, was never of stone or brick, but wholly of wood, and these rotating or movable buildings ranged in size from about 10 by 12 feet to 16 by 24 feet in the larger ones, and up to two stories in height. At the top of the mills, of course, was located the wheel shaft and gearing, and to protect this from the weather there was always a covering or "mill head" or top, and these tops have taken a great variety of interesting forms, for no apparent particular reason, and yet often a fixed style, following some geographical location. For instance, in France the almost universal or characteristic shape is that of a steep true cone; in Denmark, Sweden, etc., a Turk's head or turban type was the standard; also in England, on the great tower mills. Yet in Holland, on the same type of mill, such was never used, but a distinct Dutch form of irregular shape, and almost always thatched. And in the Mediterreanean countries the tops become so flattened or lowered as to in some cases almost disappear. The accompanying plate well illustrates these structural and geograpical differences.

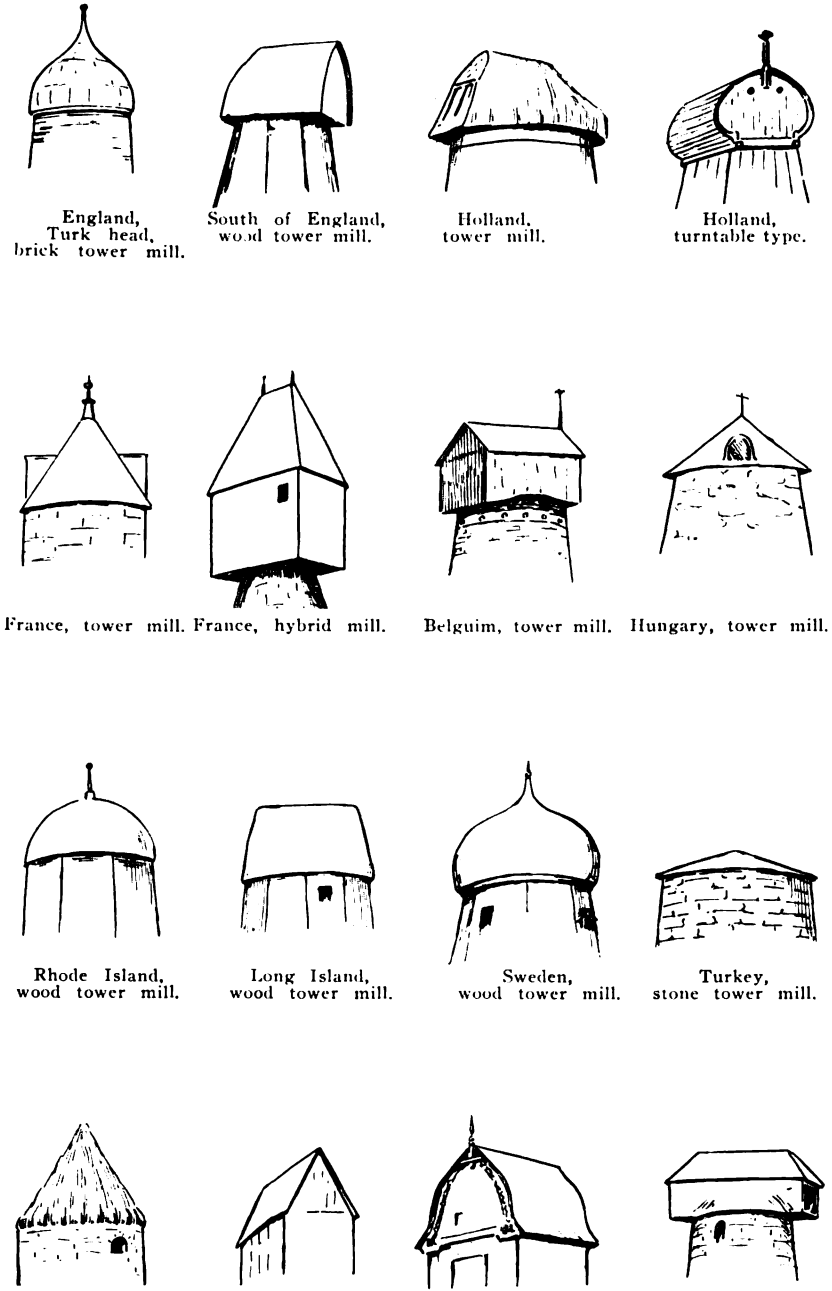
While the old mills all divide into either post or tower mills, there are yet two well-defined further forms, or variations of type, that should be remarked.

Sometimes a tower mill would be constructed on a circular timber framework or base, carried on rollers or iron balls, forming a large turntable, enabling the turning of the entire edifice to the wind, as need be, the same as a locomotive turntable or a rotary drawbridge is turned. This therefore parallels the post mill type, in which the entire structure is turned to follow the wind, but turning on this turntable base instead of a post. This form was extensively used in the saw mill and lumber districts of Holland.

The other variation is what may be called a hybrid form—part post type, part tower type. In this the contained machinery is fixed in the base, and does not rotate, being thus of the tower mill design; while in the upper part of the mill a rectangular wood housing, like a post mill, is pivoted and revolves with a tail beam, as in the post design. Such hybrid forms are found in Holland and in the valley of the Loire, at Saumur, Chinon, etc.

(B) The Sweeps.—With mills built for centuries and by all countries, it is but natural to expect to find a wide range of form in this most characteristic part of a windmill—the sweeps or vanes; and in this one is not disappointed.

The usual, earliest and simple form was that of a canvas or sail covered framework. This canvas covering could be reefed to suit the strength of the wind, and the four measures of sail spread were known as "full sail," "quarter sail," "sword point" and "dagger point," respectively—these last two, from a fancied resemblance of the shape of the partly furled or reefed cloth to the point of a sword or dagger. But these canvas sails were laborious to handle, and in no sense automatic in varying the amount of surface according to the strength of the wind, which resulted in numerous schemes for betterment. The most successful of these and that known as "patent" sails was the invention of Cubit, an Englishman, who, a century and a quarter or so ago, devised a series of wood shutters forming the face of the vane, all connected by little levers and cords or rods to a counter-weight. This, when adjusted, would cause the shutters to give a full, flat surface to the wind, but if the wind should increase to a danger point, its force would overcome the pull of the weight and the hinged shutters would all open the necessary amount to spill some of the wind through and thus ease the pressure on the sweeps. This was a good deal like a huge Venetian blind arrangement, as to the shutters or slats; and in some cases these shutters worked against the tension of a spring instead of the pull of a weight, and such were known as Meikle's "spring sweeps." Still another arrangement—Bywater's—was that of the canvas being mounted upon a long roller, a good deal like a modern



England, Turk head, brick tower mill.

South of England, wood tower mill.

Holland, tower mill.

Holland, turntable type.

France, tower mill.

France, hybrid mill.

Belguim, tower mill.

Hungary, tower mill.

Rhode Island, wood tower mill.

Long Island, wood tower mill.

Sweden, wood tower mill.

Turkey, stone tower mill.

Mediterranean, tower mill.

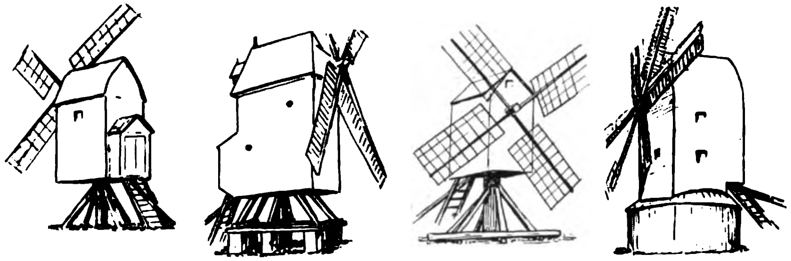
Plain, post mill.

Belguim, post mill.

Barbadoes, tower mill.

TYPICAL WINDMILL HEADS.

POST MILLS.
All pivoting on single centre post support.



Small form.

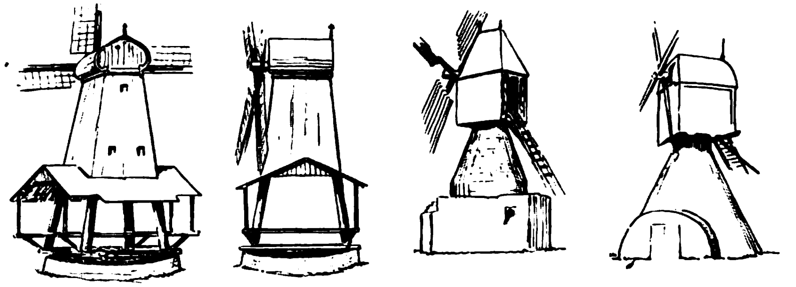
Large form.

North Carolina, U. S. A.

England, turret form.

TURNTABLE MILL

HYBRID MILLS.

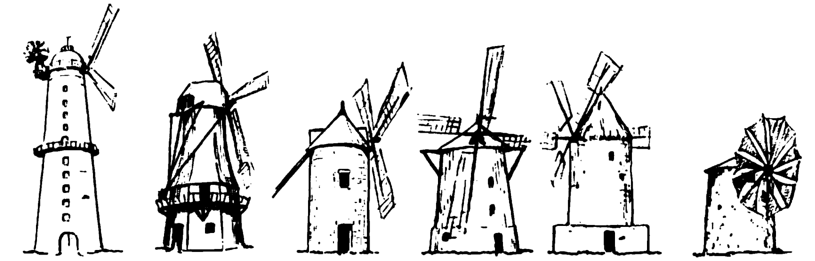


Holland, side and end view.

France, grist mill.

Holland, dumping mill.

TOWER MILLS.



England and Holland, brick.

Holland, Germany, Sweden, etc., wood.

France stone.

Hungary, stone,

Spain, stone.

Turkey and Eastern Mediterranean.

THE FOUR TYPES OF WINDMILLS.

window shade, which rolled and unrolled as needed; but this was rather complicated and not much in vogue.

It was usual to have four-fifths of the area of the sweeps on one side of the arm and one-fifth on the other, and these were "single sweeps"; while those in which there was a wide area on both sides—as almost the universal practice in France—were known as "double sweeps." Wood has been used as a sweep covering as well as canvas—as for instance in France, where one finds some of the most primitive, crude mills, with sails made of thin boards interlaced or woven into the vane framework; while, on the other hand, one also finds quite an elaborate construction. This is in the mills of the Loire valley, in which a dozen parallel boards on each vane are rigged much like a great Japanese fan, which when open presents a large surface, but when closed presents but little, the boards or wood strips overlapping and resting one upon the other. This construction I have found nowhere but in that section.

Going still further toward the primitive, we find in the Mediterranean, especially in the eastern end, in Asia Minor, in the vicinity of Smyrna ,Turkey; the islands of Rhodes, Chios, Samos and of Greece and the Sea of Marmora, a construction consisting simply of poles, anywhere from six to a dozen, stuck in the hub, carrying flying jibs, resulting in a wheel not far different in form from the paper spinwheel that a child may make! In Sicily and the Balearic islands these become a little better, having the wood framework to hold the canvas in the most effective position, and they form a transition phase between the crude jib wheels of the Orient and the elaborated types of the north.

In number the arms of the usual mill were four—and almost universally, for this was not only the simplest and strongest construction compared with the difficulty of framing six or eight firmly at the hub, but also the most effective. For it was found that the wind had to have a certain amount of exit space between the vanes to get away freely, and that if this part of the circle was too much filled with additional sweeps no corresponding gain in power was secured. A few very fine examples, however, can be found of these five and six-arm mills, as in the famous 100-foot brick tower mill of Whitby, England, with five arms and its Turk's head top; and at Lewes, where a fine turret mill and others have five and six arms.

The length of these arms in an ordinary size mill was about 30 feet, giving a diameter to the wheel of 60 feet; but in the big tower mills referred to the arms were sometimes 50 and 60 feet long, making the wheels well over 100 feet in diameter. The usual speed was about 16 revolutions a minute. If faster than 20 a danger point was reached that was very real, for there have been many cases of runaway mills, resulting from defective brakes or accident or carelessness; in which accidents millers have been caught in the vanes or sweeps and carried around and around and thrown off; or millstones bursting from too high a speed have amputated the miller's legs; or friction heat has set the structure afire.

It is of course obvious that the surface of these windmill sails could not be really flat, as in that case, the wind blowing against it would merely recoil and exert no power effect. A warp or twist was requisite, that the wind might give a thrust to the sail in passing through the wheel, precisely the reverse action of a screw propeller on a boat.

This twist was known as the "angle of weather" or "bosom," and the precise amount and form were the subjects of many early abstruse and learned studies. Practice finally settled down to an angle of about 17° at the inner end and about 8° at the outer end of the sail as being the most effective.

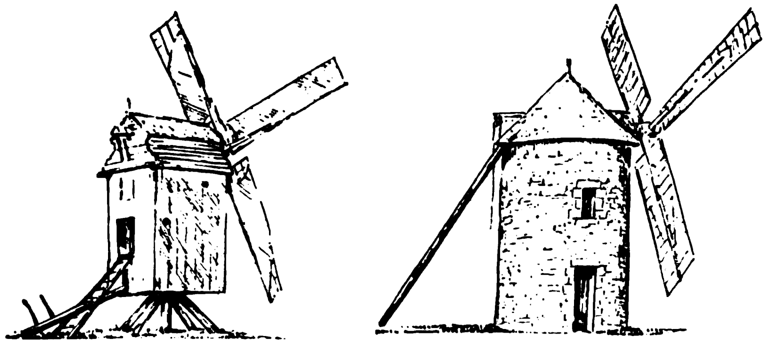
The mounting of these huge wheels was a matter of some moment, requiring very heavy construction, and this resulted in the use, as a rule, in all the earlier and medium size mills of a great shaft or log, turned or hewed octagonal, carried by gudgeon bearings, on old blocks of soapstone, or greased oak, or cast iron bearings at either end. Into the outer projecting end, outside the roof, the square ends of the vane shafts or sweeps were mortised and bound with straps and bolts of iron. Later and in the larger mills, and after foundry work was more available, these "great-shafts" were made of iron, giving much better bearings and enabling the sweeps to be bolted into square openings more conveniently. But with all these mills, especially the early simpler forms, there was an enormous loss in dead weight moved and in friction, and it is doubtful whether in most of them 50 per cent. of the force of the wind reached the mill stones below for useful work.

There was a popular belief that the wind came down from the heavens above, and that therefore the wheel should "look up" a little, to best meet it; with the result that the shaft of the mill was virtually never set level, as one might suppose, but always with the outer end a little higher than the inner, which angle of uplift varied from 5° to 10°. A very practical result of this was also gotten, in the necessary clearance of the tapering tower by the revolving vanes. For these revolving vanes were something to be respected—a 60-foot wheel, for instance, weighing several tons and having a periphery speed of perhaps 3,000 feet a minute, and more than one horse or cow straying into the path of the arms in a mill in operation has been struck and paid the penalty. To guard against that, mills were at times set upon a dais or raised foundation, or fenced in.

The great shaft would have mounted upon it a "great wheel," from 8 to 12 or 15 feet in diameter, with cog teeth, and these engaged in a pinion or lantern or trundle or wallower wheel, as variously styled, on a vertical shaft, which led to the machinery below, and there, by any suitable and usual gear work of the olden times, whatever grist, saw, grinding, stamping or other machinery was to be driven would be duly operated by the wind power from above.

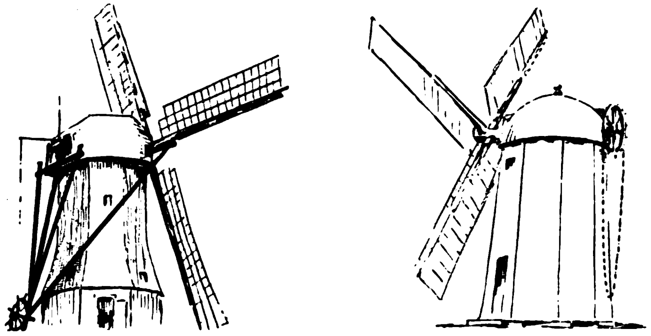
(C) The Til Beam or Vane.—The third essential feature of these old mills was the device for keeping the wheel head-on to the wind, for the purpose of securing the fullest amount of power. And this was quite a point, in view of the perpetual shifting of the wind.

The first arrangement was that of a long beam or pole projecting from the rear of the old-time post mill, used precisely like a rudder. When the direction of the wind changed this would be pushed from one side to the other, to steer the post mill structure, pivoted on the post, again into the wind. And in the succeeding tower mills, where only the top or head would be turned, the tail beam principle was continued—as best developed in Holland, where a somewhat elaborately braced and several-membered framework was carried down to a point



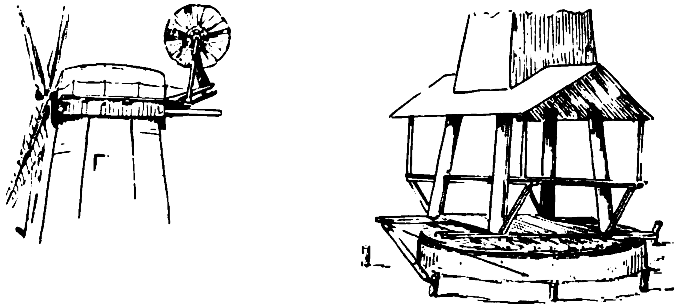
Usual tail beam on post mills and hybrid mills.

Tail beam. France, tower mill.



Tiller on Holland mill.

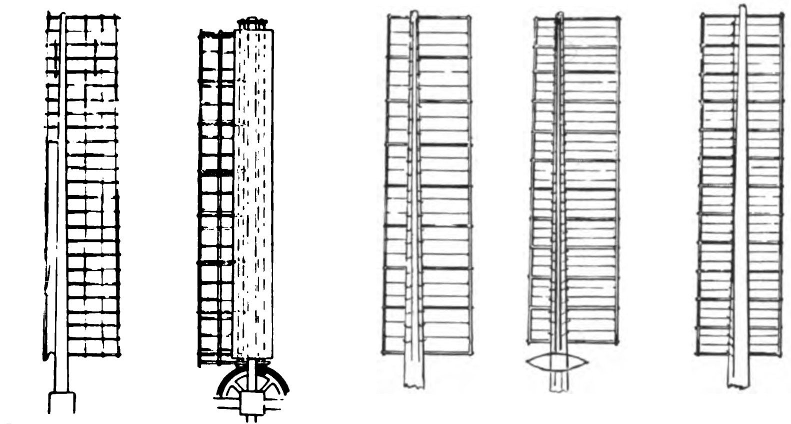
Chain-wheel on tower mill.



Cubit's automatic tail wheel, England.

Turntable mill, rollers and snubbing posts.

WINDMILL TAIL BEAMS OR TURNING GEAR.
FOR KEEPING MILL-HEAD ON THE WIND.



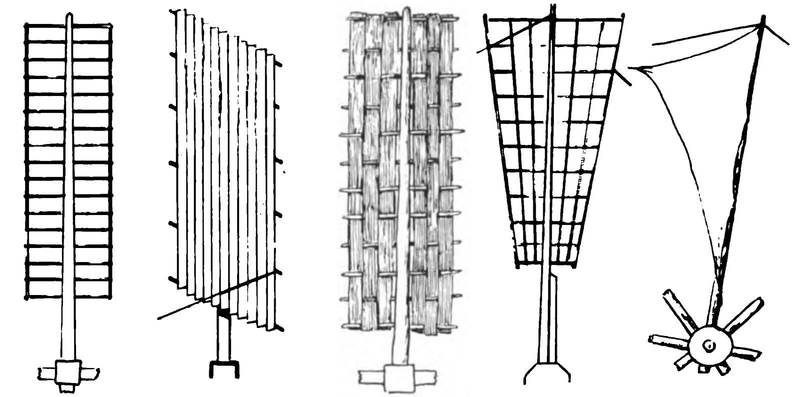
Usual canvas covered sweep.

England, Bywater's rolling canvas.

England, Cubit's patent shutter.

England, Meikle's spring sweep.

England, double shutter.



France, double sweep.

France, folding sweep.

Primitive sweep, interlaced boards.

Mediterranean, double sweep canvas.

Mediterranean, flying jib; Greece, Turkey, etc

TYPICAL WINDMILL ARMS.

where it could be reached and moved as the wind shifted. But in Holland the mills became of large size and the weight to be moved was great, so that the old Dutch miller would blow a whistle to summon his hands for help. In later years they made use of a further rig of chains and tackle and a wheel like a pilot's, which enabled the snubbing around of the vanes and cap to be done far more easily than by pushing by hand alone. This old tail beam is, however, characteristic of the old-time small mill, and many are the tracks, well worn and circular, around the mill that betoken the years of labor of the miller even if eased by an old cartwheel to carry the end of the beam, as instanced in the well-known old mill at Nantucket and elsewhere.

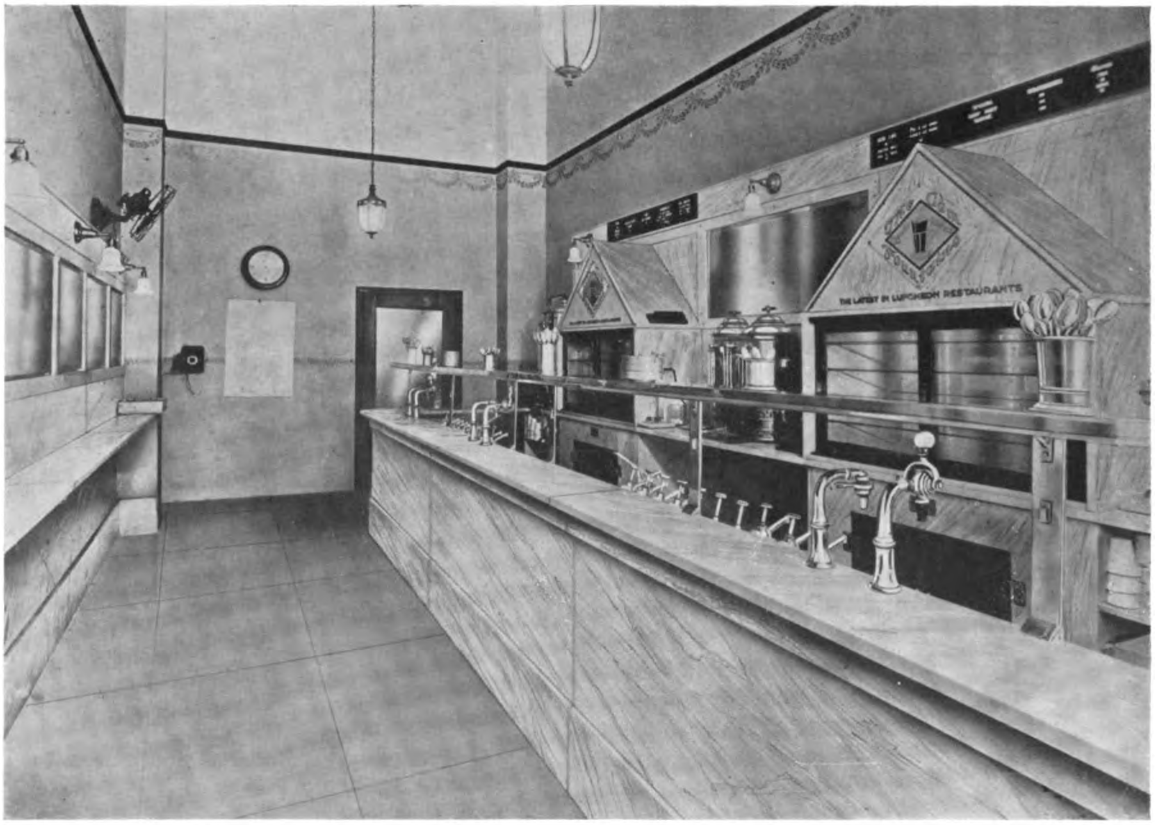
Probably the next device for turning to the wind was the use of a chain pull, connected to overhead gear wheels and a cogged track; for not only is this found in some early mills of Holland, and in the mills of Newport, R. I., but also in the rare old Peyto mill at Leamington, England, of 1632, of which I shall speak further. These chain pulls were either inside or out; the former being more protected from the weather.

But all these hand devices were completely eclipsed by another invention of Cubit—he of the "patent" sweep-shutter—known as Cubit's tail vane. This was the use of a small wheel of from 4 to 10 vanes, usually 6, placed in the rear of the head of the mill, up aloft, and so connected by a train of small gearing that when it rotated it would turn the main head a little, and if need be follow up the variations of the wind. So accurately was this designed that it is said that even with the wind shifting but a couple of degrees around the horizon the tail wheel would then begin to turn, and with its gearing would in turn wind the mill head, carrying the sweeps, into the wind. This automatic arrangement was almost universally adopted in England, in the better class of mills; yet, with the stolidity of the Dutch temperament, apparently content to continue with hand labor as did their grandfathers, this admirable device was rarely transplanted even to a place as nearby as Holland. F. H. Shelton.

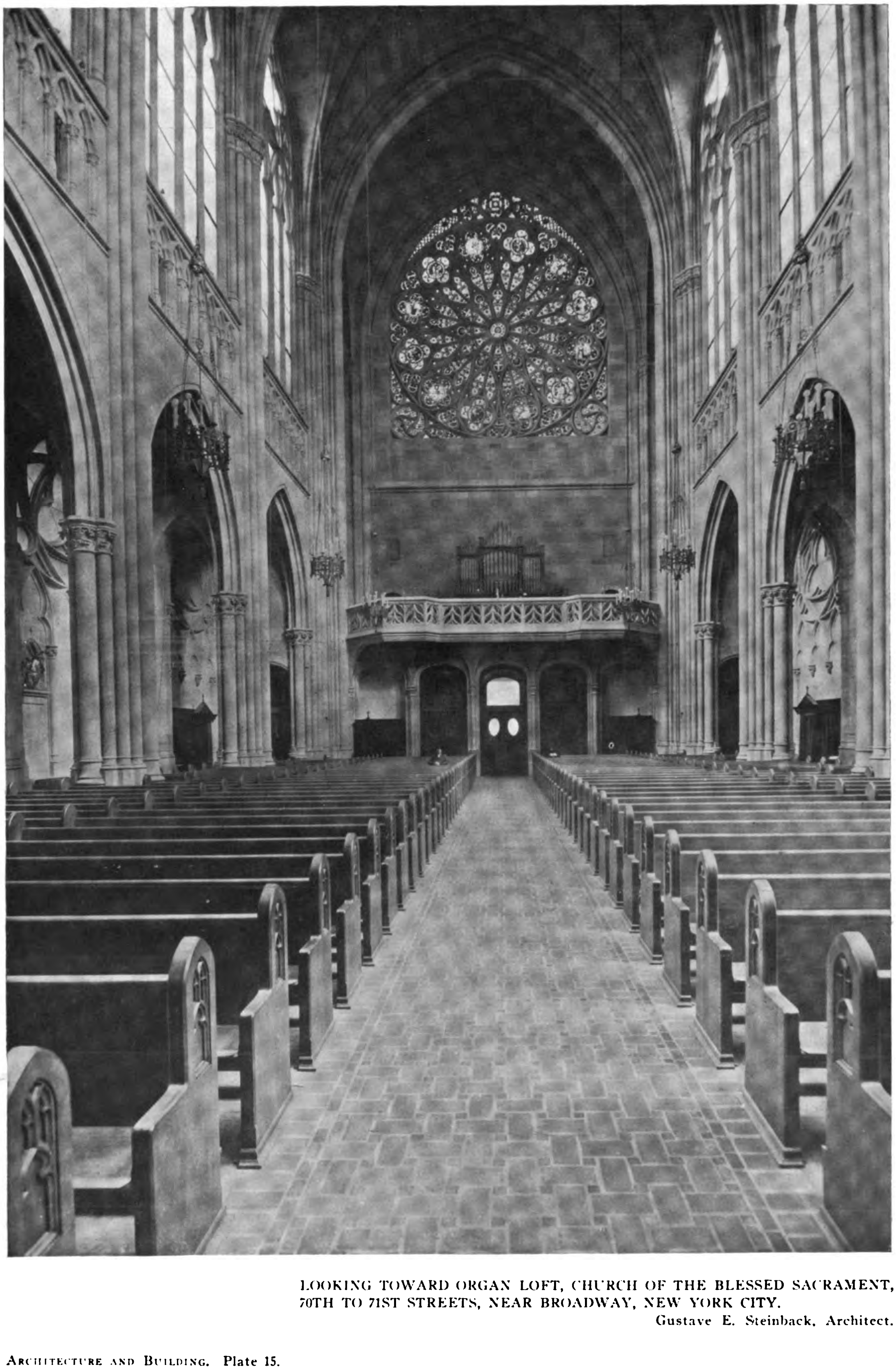
(To be Concluded)

THE SODA-FOUNTAIN SHOP—I.

With the passing of the corner emporium—the workingman's club—what is to replace it? Throughout the United States, in cities great and small, a type of dispensary whose delectable potions a large part of the population has long enjoyed has sprung into exotic growth. This mutation rapid in the extreme has received its great impetus from the mighty hand of that sturdy child, the latest addition to our family of constitutional amendments. Heretofore, the soda fountain has played its ubiquitous part as an adjunct of the candy store, drug store, or newsstand. Its function has largely been secondary to other enterprises and its form and design has usually outraged every canon of aestheticism. How far it will develop, what strange fantasies will take con-

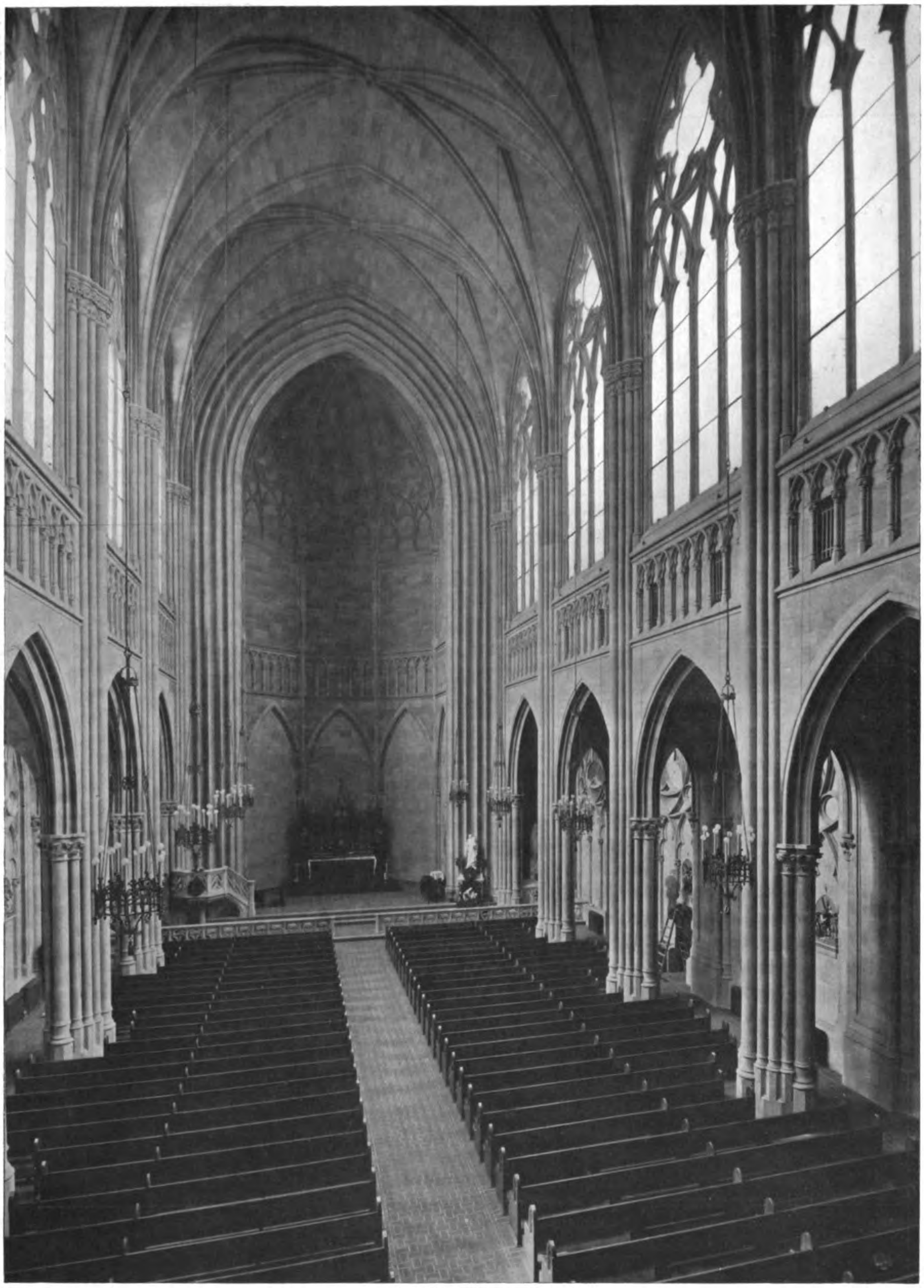


SODA FOUNTAIN SHOP IN OFFICE BUILDING AT 21 EAST 40TH STREET, NEW YORK CITY, OPERATED BY THE GEM FOUNTAIN CORPORATION.
Fountain Equipment—Braunstein Bros. Soda Fountain Co.



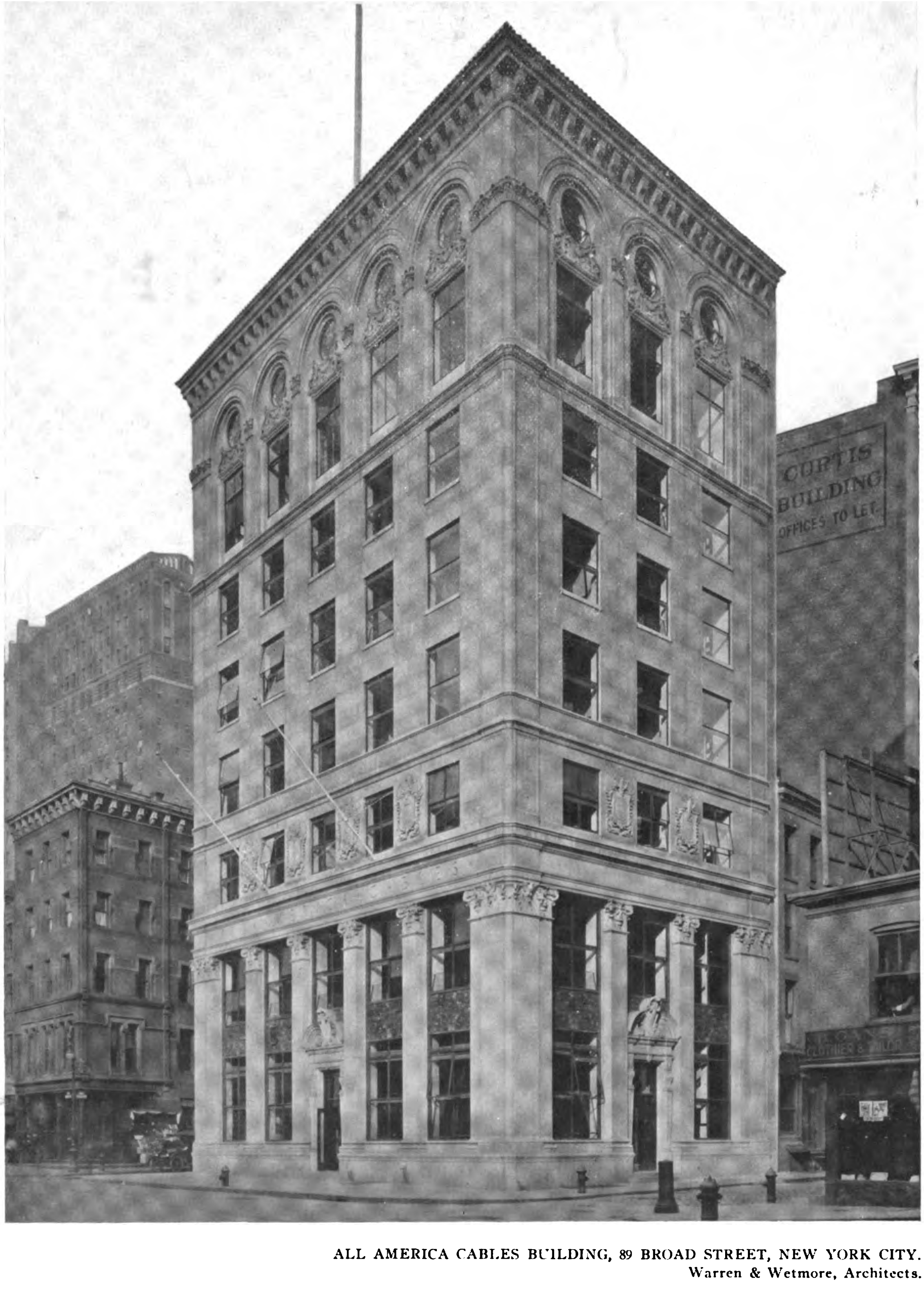
LOOKING TOWARD ORGAN LOFT, CHURCH OF THE BLESSED SACRAMENT,
70TH TO 71ST STREETS, NEAR BROADWAY, NEW YORK CITY.
Gustave E. Steinback, Architect.

Architecture and Building. Plate 15.
Built by John T. Brady Co.; ornamental glass windows—Clement Heaton; key lock tile arches and acoustic stone finish—Key Lock Arch Construction Co., Inc.; tile—D. H. McLaury Tile Co., Inc.



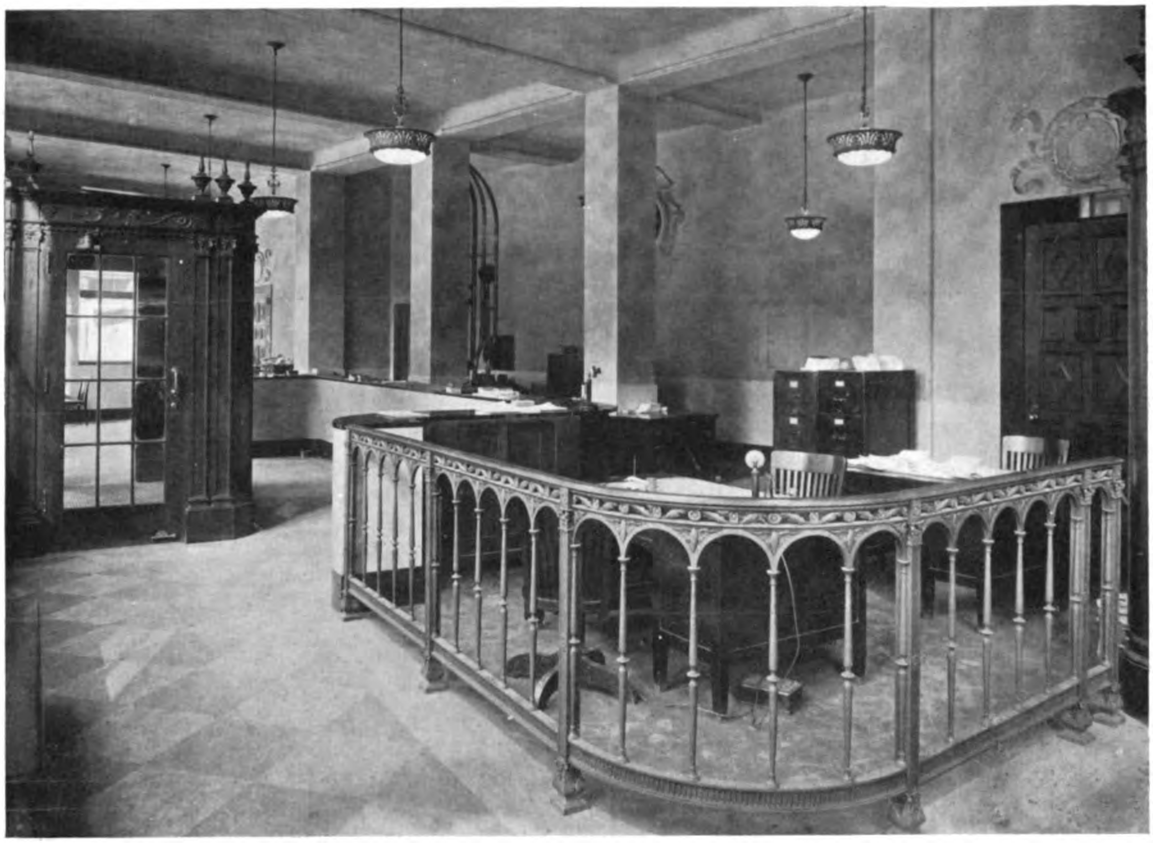
LOOKING TOWARD ALTAR, CHURCH OF THE BLESSED SACRAMENT, 70TH TO 71ST STREETS, NEAR BROADWAY, NEW YORK CITY.
Gustave E. Steinback, Architect.

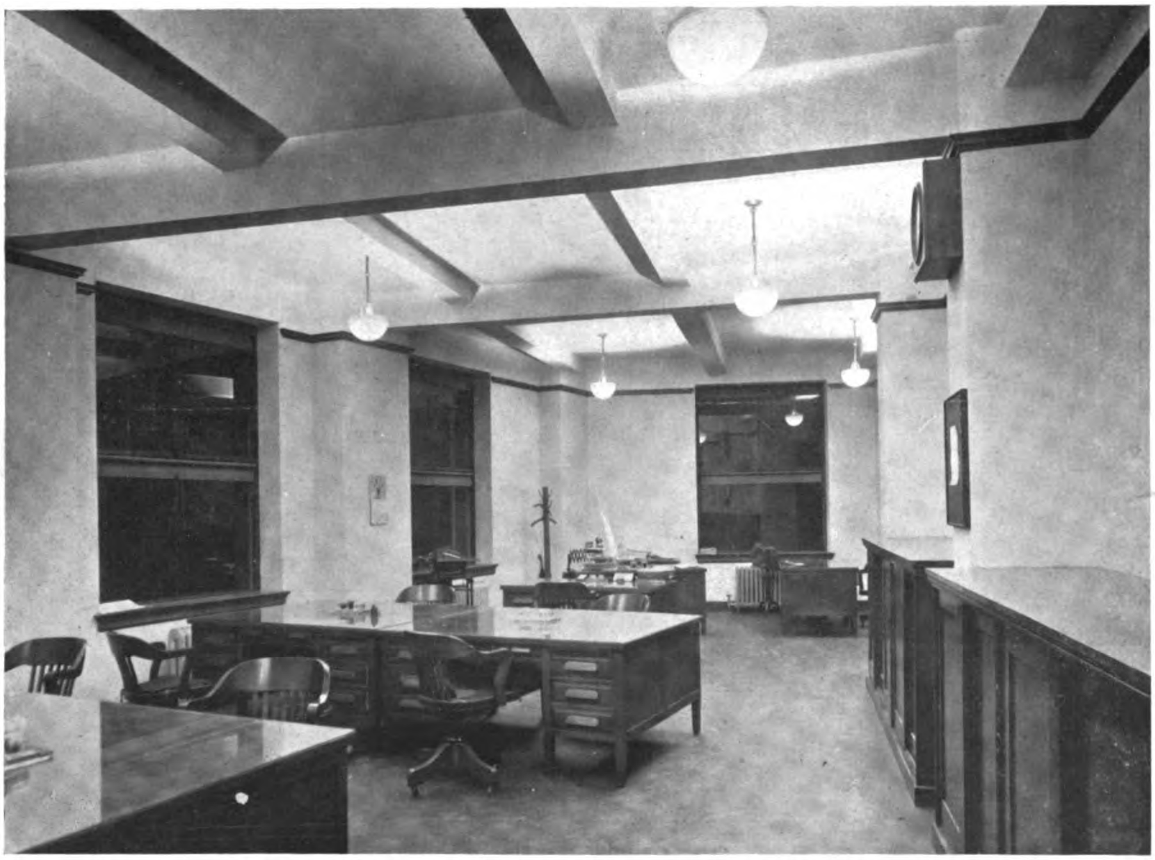
ARCHITECTURE AND BUILDING. Plate 16.
Lighting Fixtures—G. E. Walter; Electrical contractors—Reis & O'Donovan, Inc.
cut cast stone—Benedict Stone Corp.; vacuum cleaning system—Allen & Billmyre Co.



ALL AMERICA CABLES BUILDING, 89 BROAD STREET, NEW YORK CITY.
Warren & Wetmore, Architects.

Architecture and Building. Plate 17.
Built by John I. Downey, Inc.; steel windows—Winslow Bros. Co.; plumbing—James McCullagh, Inc.; ornamental iron—Lieberman & Sanford Company; elevators—A. B. See Electric Elevator Company; cement walks—Harrison & Meyer; electrical contractors—J. Livingston & Co., Inc.

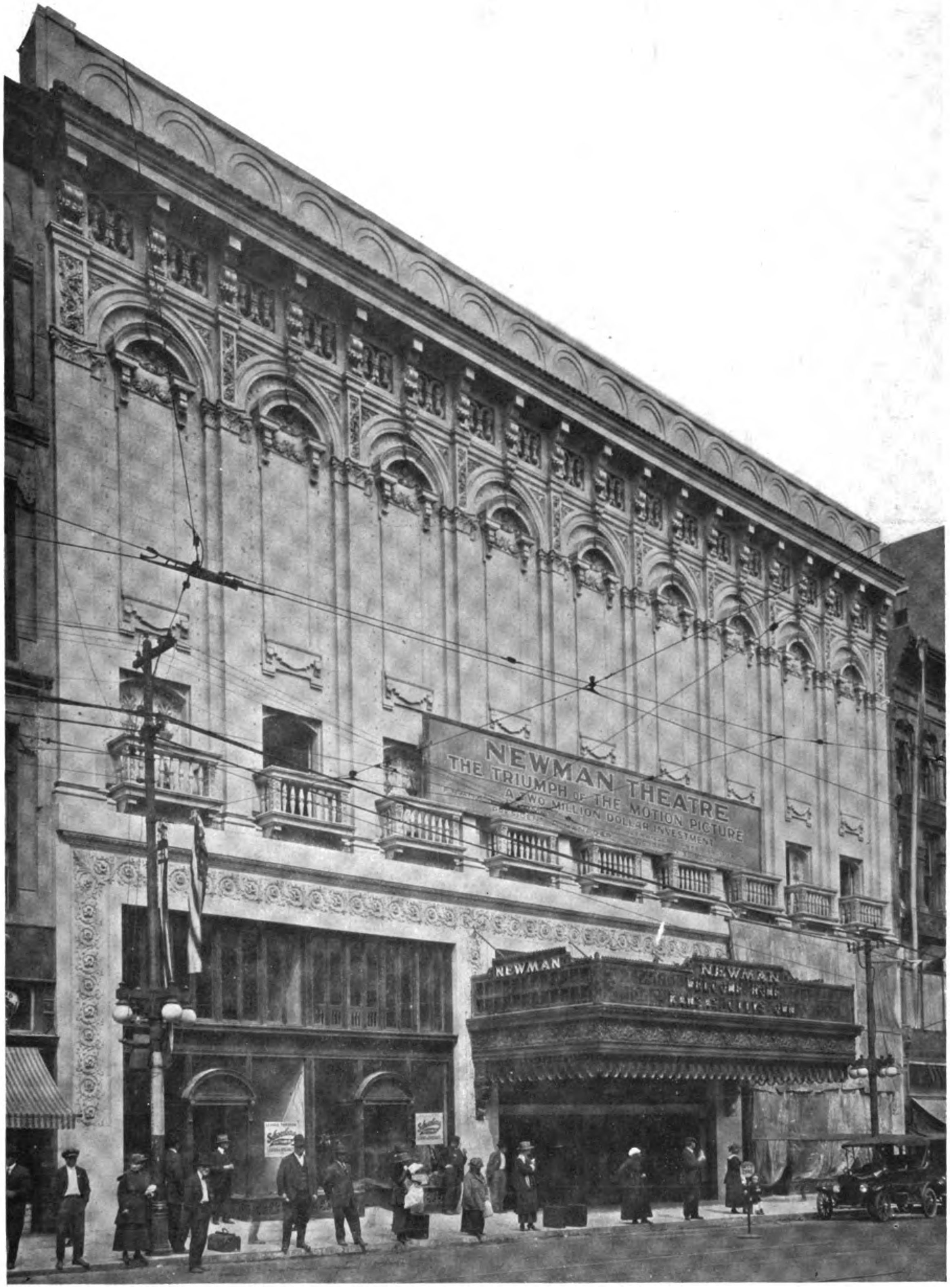




MAIN FLOOR AND TYPICAL OFFICE, ALL AMERICA CABLES BUILDING,
89 BROAD STREET, NEW YORK CITY.

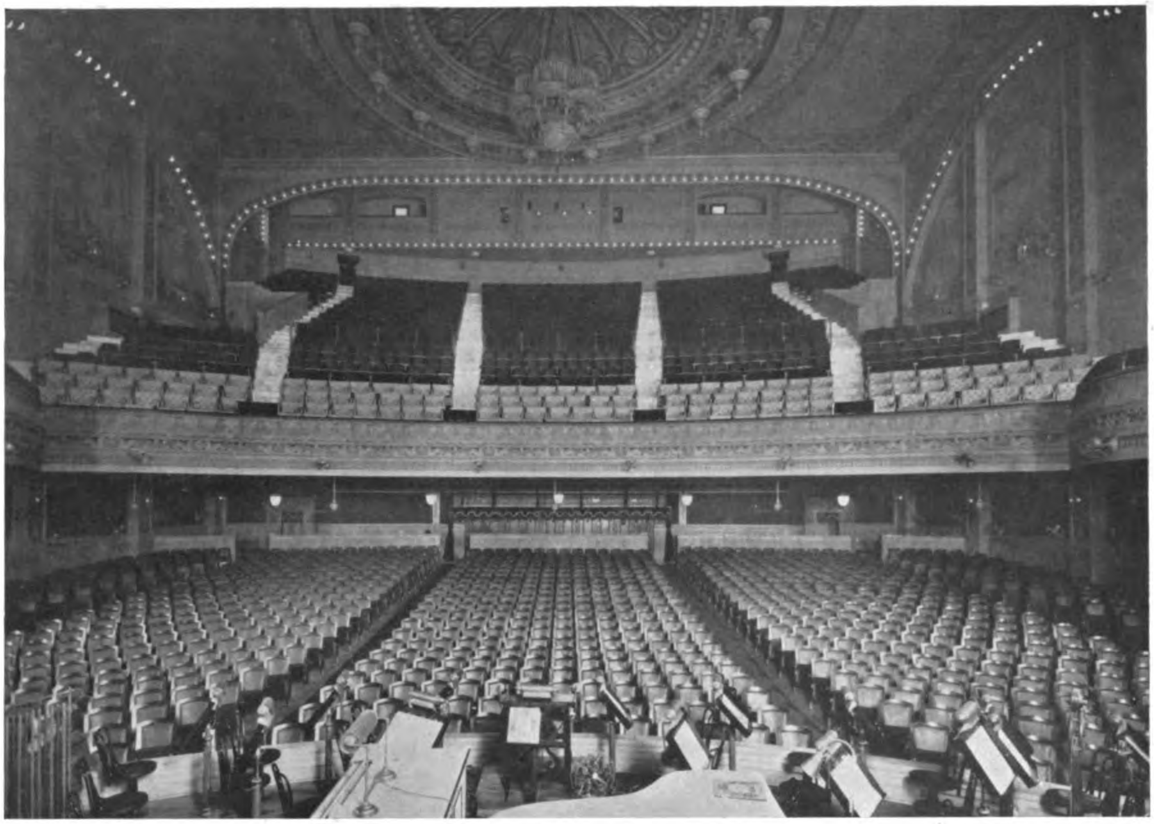
Warren & Wetmore, Architects.

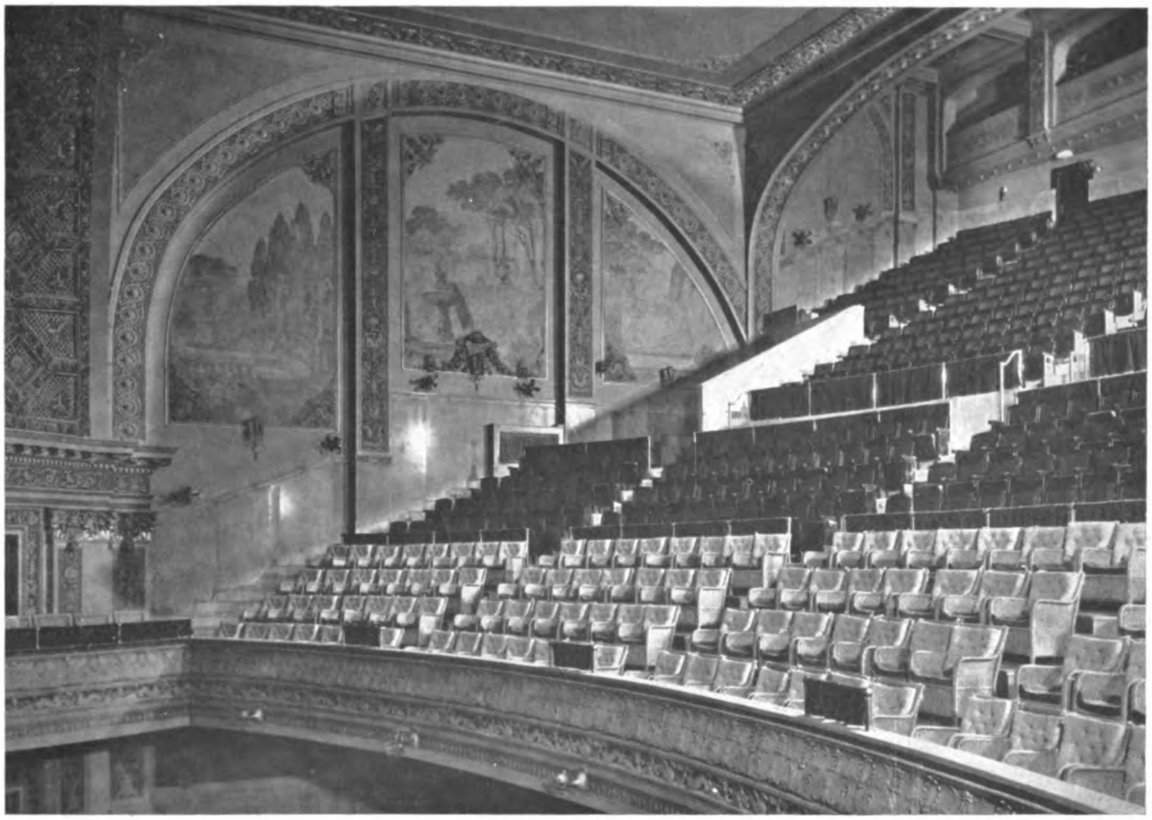
ARCHITECTURE AND BUILDING, Plate 18.
Built by John I. Downey, Inc.; electrical contractors—J. Livingston & Co., Inc.; ornamental and plain plastering—H. W. Miller, Inc.; ornamental iron rail—Lieberman & Sanford Company; chairs—The Sikes Co.; cement floors—Harrison & Meyer; National X-Ray reflectors.


NEWMAN THEATRE
THE TRIUMPH OF THE MOTION PICTURE
A TWO MILLION DOLLAR INVESTMENT
NEWMAN
NEWMAN

NEWMAN THEATRE, KANSAS CITY, MO.
H. Alexander Drake, Architect.

ARCHITECTURE AND BUILDING. Plate 19.
Heating and ventilating—General Heating Supply Company.

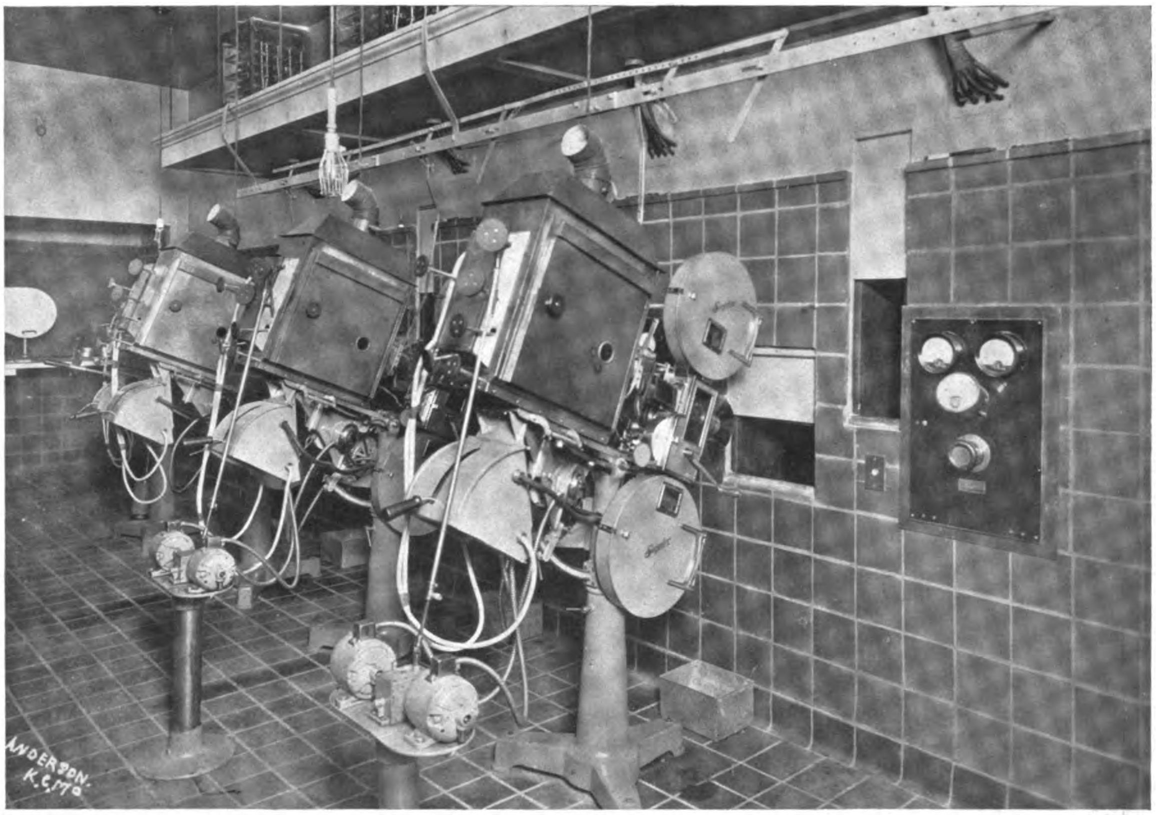


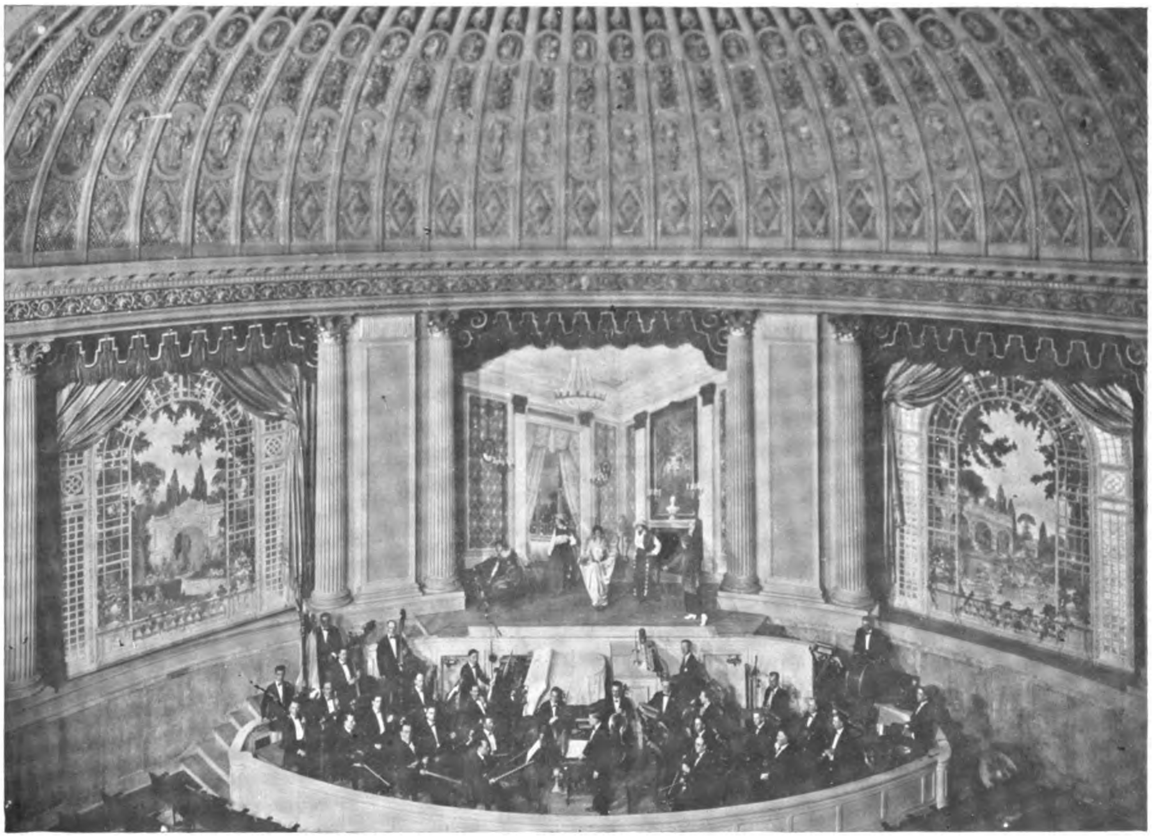


AUDITORIUM, SHOWING MURAL PAINTINGS, NEWMAN THEATRE, KANSAS CITY, MO.

H. Alexander Drake, Architect.

ARCHITECTURE AND BUILDING. Plate 20.
Decorators—Mitchel & Halbach Co.; General Heating Supply Co.'s vento-floor diffusers used for heating and ventilating.

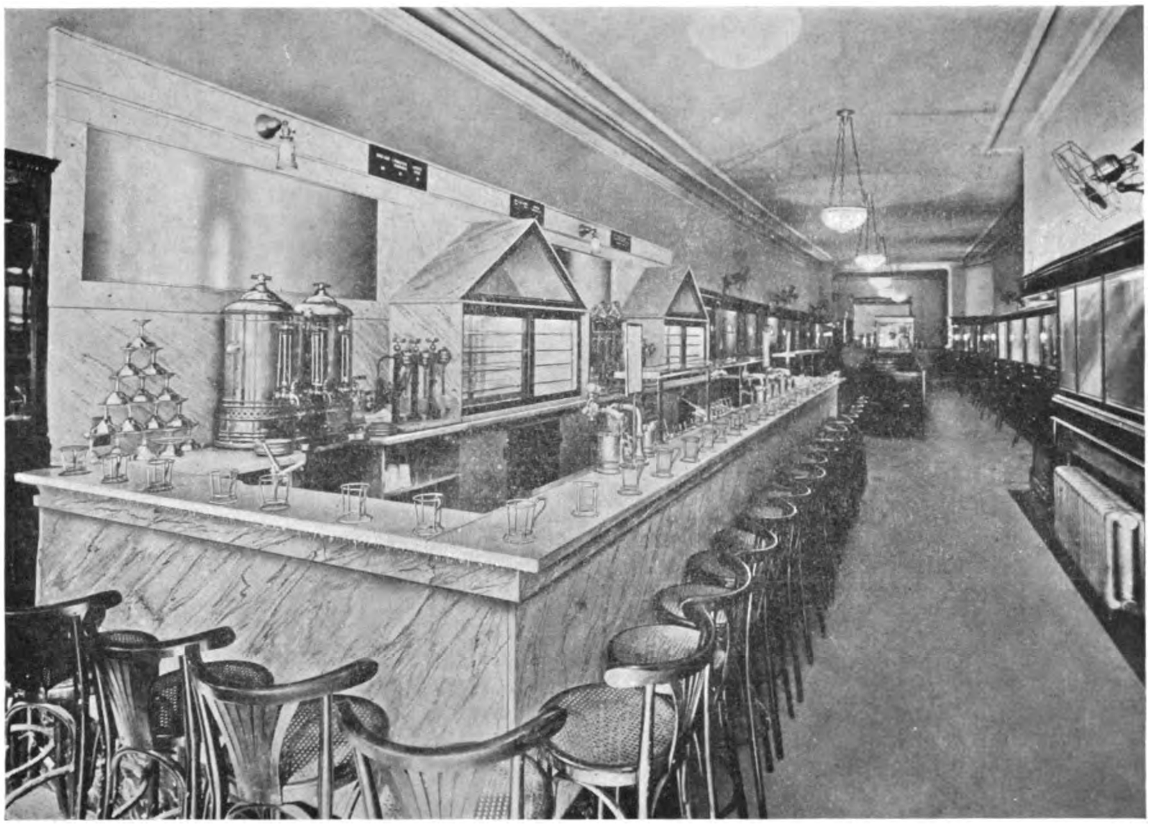


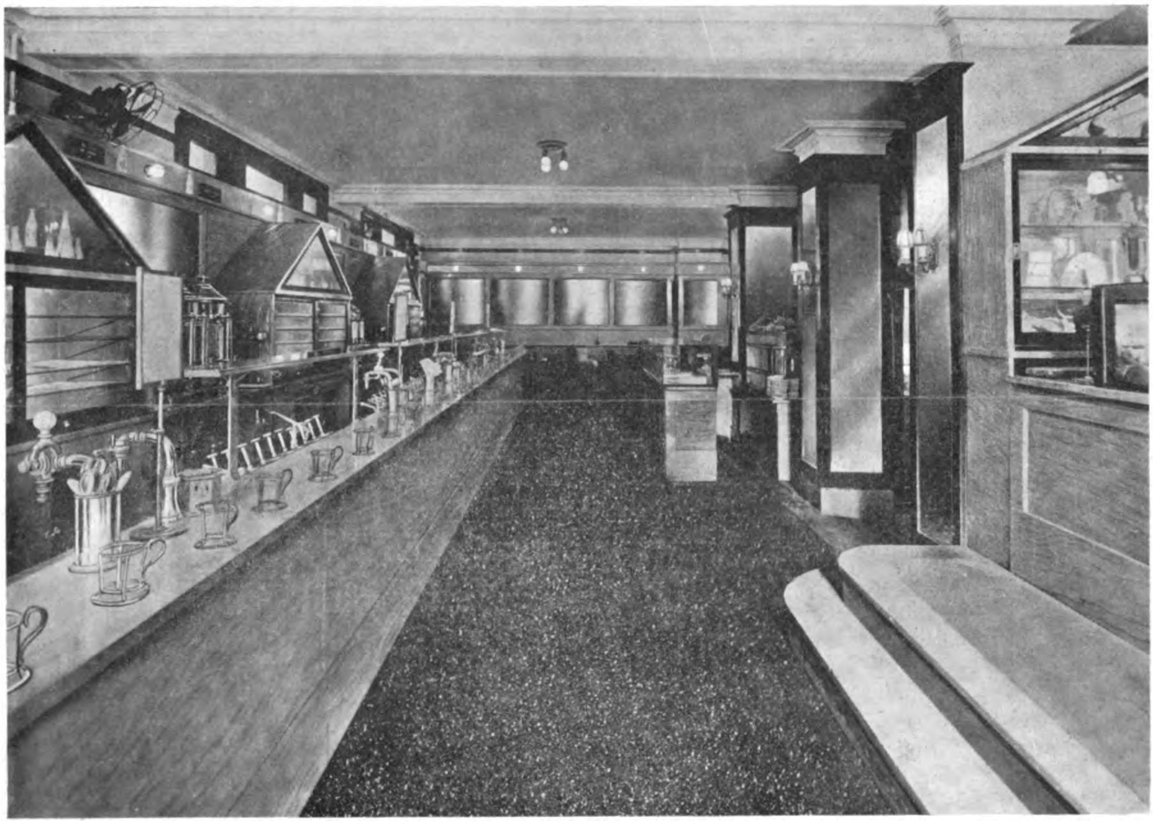


MOVING PICTURE MACHINE ROOM AND STAGE, NEWMAN THEATRE, KANSAS CITY, MO.

H. Alexander Drake, Architect.

ARCHITECTURE AND BUILDING. Plate 21.
Ticket selling device—The Automatic Ticket Selling & Cash Register Co.; stage and light equipment—New York Calcium Light Co.; moving picture machines made by Precision Machine Co.





TWO SODA FOUNTAIN SHOPS OPERATED BY THE GEM FOUNTAIN CORPORATION IN NEW YORK CITY. ABOVE—AT 33 MAIDEN LANE WHERE MAXIMUM SEATING IS PROVIDED. BELOW—AT 80 WALL STREET WHERE STANDING SPACE IS IN EMPHASIS.

ARCHITECTURE AND BUILDING. Plate 24.
Fountain Equipment—Braunstein Bros. Soda Fountain Co.

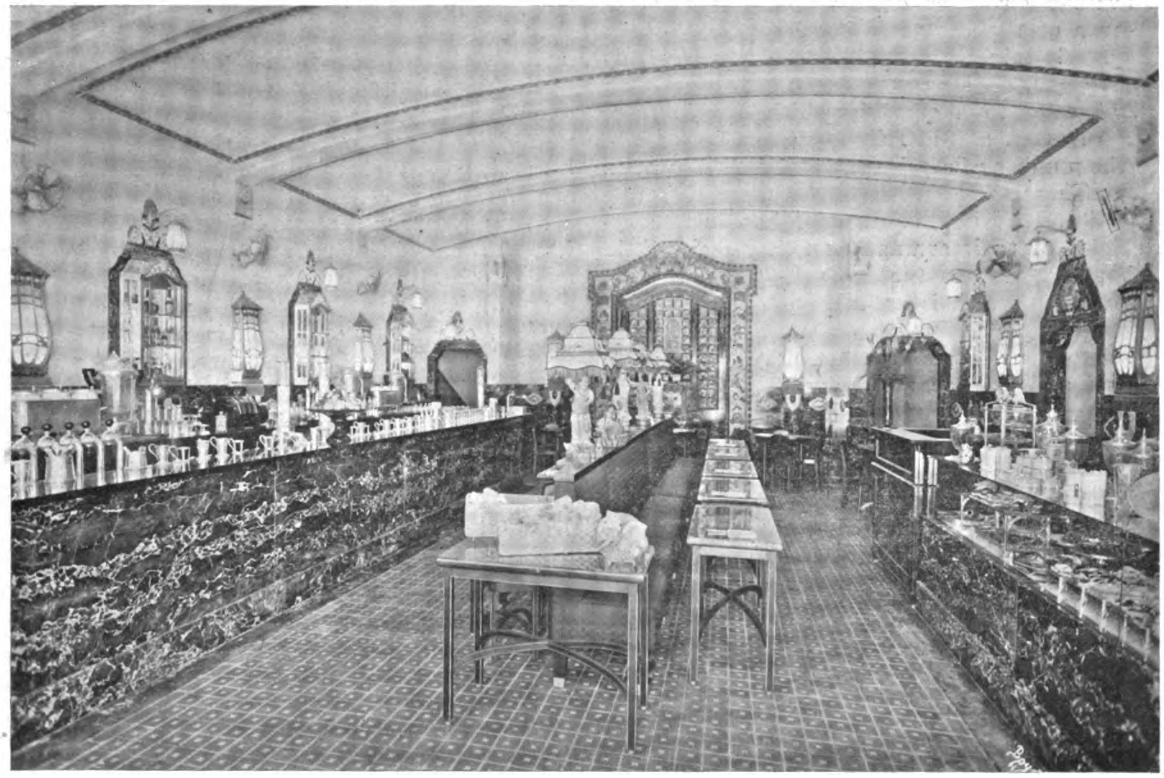
crete form, who will stand pre-eminent in this prodigious development of the soda fountain.

This question is finding its solution now in the fine stores on our principal thoroughfares and the attractive adjuncts of our new moving picture houses and hotels. The soda fountain with lunch rooms often in combination is coming to the front. It is to be in the future a prominent feature of all public gathering places and that this is recognized and being exploited rapidly is characteristic of the enterprise of our business men and the general opportunism of the times. The soda fountain is to be a great American institution and is the successor to our corner saloon, whose heyday of popularity has passed. That it will have an even greater popularity seems inevitable and in the present rush of its development it is unrestrained for the most part by any regulations except such codes of sanitation as may exist in various communities and restriction that may be placed upon it by health officers.

The soda fountain as it is now developing seems from its latest examples to be of most excellent character, both as to practical design, sanitary requirements and attractiveness of appearance. That there are remarkable opportunities for it are unquestioned and many designers will be called upon to exercise their architectural talents in developing appropriate interiors, the most efficient arrangements and planning in accordance with the requirements and the amount of money that the prospective owner is prepared to spend. In our hotels, it will replace the bar and also without doubt the cafe. Examples of this are already to be noted in many instances, where the demand was great and war-time prohibition went early and forcefully into effect. The new Hotel Washington, in the national capitol, had in its original planning a space allotted in the basement on the Pennsylvania Avenue side for a barroom and cafe. Before this was completed the plan was changed and instead of the bar equipment the scheme was changed to a soda fountain shop, with its appurtenances. The decoration was changed to a light scheme and several rooms equipped with light chairs and tables and the waitress replaced the waiter, as a dispenser of beverages.

Even in New Orleans, a stronghold of old customs, the trend of the times was indicated by the opening of a splendidly equipped soda fountain and lunch service connected with the Hotel Grunewald. This was in operation before war-time prohibition took effect and its extensive patronage bespoke its popularity.

To analyze the field open to the soda fountain shops leads to an extensive study of modern business and living conditions. It is far from the simple proposition that it might at first seem for location, neighborhood conditions, class of population and climate in various sections of the country play an important part. Already two distinct types have appeared, one catering to the requirements of those who wish a quick, low-priced lunch and those who require only a fancy drink between meals, or stop for refreshment after the theatre. There are subdivisions of both, according to the location and the clientele appealed to. There are many examples at present of well-equipped soda fountains, both with and without the service of food, located in cigar stores, drug stores, department stores, railroad stations and elsewhere, which for the present we will disregard. It is the purpose of this and following articles on the subject to discuss the soda fountain shop as an enterprise self-



SODA FOUNTAIN SHOP WITH LUNCHEON SERVICE IN THE HOTEL McALPIN, NEW YORK CITY.

John J. Petit, Architect.

Red Cross soda fountain equipment—The Bishop & Babcock Co.

maintained and forming the principal feature of the business carried on in the premises. Such shops are being opened in our business, shopping and amusement districts in street stores. Others are connected with theatre buildings, hotels and office buildings. All of these conditions, where the shop is essentially an enterprise by itself, will be discussed in detail.

Location as influencing the type of shop is a matter of first consideration. In a business district whether the shop is located in an office building or in a street store indicates a design and equipment that will cater to office workers of both sexes. The shop should be designed to give great rapidity of service and have the utmost flexibility to conform to the demands or whims of the customer. In some locations counter service will be the thing most in demand, and here the soda fountain should be equipped so as to serve both beverages and light food expeditiously and food, such as sandwiches, should be within reach of the customers so that they may serve themselves. In other locations more space should be devoted to tables and less to counters so that customers may be served at the tables and receive all necessary attention. The average restaurant figures on two services per chair during the usual rush hours between 12 and 2. But in these shops the service is greatly increased and in some as high as eight services can be made during the same rush hour period, figuring on the patrons spending an average of $.30 each. One noticeable characteristic is the atmosphere of quick service which prevails. The impression is that every patron has come in to make his purchase and leave as quickly as possible. Lounging is not encouraged and this effect is produced by the general style of furnishing and equipment and the air of the shop. Quick service is what the average customer desires and gets and the rapid turn-over of the customer is of course the aim of the shop. It might be said to be unobtrusively evident.

Some shops cater to a clientele which spends more money, even as much as $1.00 for very service, and in these cases the number of services made during the noon period is less. These shops are generally more elaborate in their appointments and equipment, but in the essential principles of their arrangement they differ little from the shops catering to the low-priced trade.

The type of shop which is appearing in the shopping and amusement districts is much different in character. It is designed to cater to people when they have leisure hours to spend and the decorative and ornamental features of the shop are emphasized. The line of beverages dispensed might be classified as fancy drinks and the pastry and confections served are of a more expensive and palatable character rather than possessive of nutritive value. Numerous examples of this class can be sited as adjuncts of hotels and theatres and also in separate shops located in the amusement districts.

In general, it has been shown by those engaged in the business that the soda fountain cannot be successfully adapted to lunch rooms. In a number of cases where they have been installed in restaurants, they have not proven successful, being more of a detriment to the restaurant trade than otherwise. On the other hand where the soda fountain is featured as the main thing it has worked out that a limited lunch service can be added.

In discussion with a member of a firm operating a chain of soda fountain shops this point was forcefully brought out by actual figures and examples, and this same gentleman in commenting upon the subject stated that he had found that people liked to be waited upon and he did not favor the cafeteria idea of self service from a business point of view. Furthermore, he said the soda fountain shops should cater equally to both men and women and in the majority of shops operated by his firm the custom was about equally divided between the two sexes. In establishing a shop in a given location he had found a careful study of local conditions necessary as indicative of the type of shop to be installed to meet the requirements of the patronage.

In further articles of this series space and service will be considered in connection with the possible number of patrons which may be handled within a given time and the planning of various shops will be shown and illustrated with full data as to the arrangement of the fountains and the proper floor area to be allowed for public space and the arrangement of the equipment in connection with the entrances. Following that, the design of the fountain bar and counter will be described together with the general equipment of the shop. The mechanical design, plumbing equipment, dispensing apparatus, washing and service appointments and general subjects such as lighting, ventilation and cooling will receive consideration. Wm. P. Comstock.

(To Be Continued.)

THE PROJECTION ROOM.

Newman Theatre, Kansas City.

Going behind the scenes of a moving picture theatre consists of a trip to the projection room. The star of moving picture theatre is the projectionist and this star's dressing room is the projection room. It may be said with truth that the quarters of the projectionist are more finely appointed in the modern moving picture house than are those of the most noted artists of the so-called legitimate stage. Everything is considered, working quarters, giving cleanliness, ample space, ventilation and good lighting, mechanical equipment of the best and provisions for the personal comfort of the projectionist and his assistants, such as rest and smoking room and toilet room.

In the Newman Theatre in Kansas City, Mo., is a projection room of unusual accommodations even for a large modern theatre. The projection room itself occupies a space 31 feet long 9½ feet wide with a ceiling height of 11 feet. In additional there is a special room for the rewinding of films, 6 feet square. The rooms have tiled floors and a 6-foot wainscoting built of Indian red tile with a sanitary curved base about the walls. The color of the tiling is in contrast with the French grey tint of the upper walls and ceiling. Adjoining the projection room are two balconies which serve as rest rooms and smoking room for the projection room crew. These balconies are furnished with comfortable chairs, and they are neatly and attractively decorated. There is an adjoining toilet room.

There are six large windows located near the ceiling in the rear wall of the room which are equipped with opaque shades. In addition to the ventilation provided by these windows, there is a 16-inch vent in the ceiling, and there are two 36-inch electric ceiling fans to cause air circulation in the room.

The mechanical equipment of the projection room consists of 3 type S "Simplex" projectors which present a very attractive appearance in their battleship grey finish with nickel trimmings. It is noticeable that there is no open wiring, all of the connections being made beneath the floor with outlets and connections through the pedestals of the machines.

At each machine is located a separate panel upon which is mounted the rheostat control, ammeter, voltmeter, and speedometer. The rheostats for each machine are located in a specially designed rheostat gallery suspended from the ceiling of the projection room, thus eliminating heat and giving an unobstructed floor space to the entire room. These rheostats are specially constructed and are of the multiple 120-ampere type, containing one 50-ampere stop and seven 10-ampere stops. Beneath each observation port are located the signal boards, which connect with the orchestra leader and stage manager, respectively, and furnish a ready means of intercommunication at all times.

A feature of the projection room is the specially constructed dissolving devices which are attached to the lamphouse hood of each projector and are operated by a main lever, the mechanism of which is so arranged as to permit the working out of any three separate combiations of "fade-ins" for as many machines.

The drop lights at each machine are hung from special tension "wind-up" pulleys and may be pulled down or raised to any required position at will, much in the same manner as the ordinary window shade. Lamp shades are so arranged on these pilot lamps as to prevent the reflection of any light through the projector or lookout ports.

There are two special machines, a counter-weighted combination spotlight and curtain dissolving flood and a stereopticon, which are mounted on pedestals similar to the projectors and are similarly finished so as to give uniformity in the appearance of the equipment.

The spotlight is fitted with a specialty constructed iris diaphragm which is 8 inches in diameter. By operating this diaphragm which works on lever principles, it is possible to procure any sized spot instantaneously and be assured at all times of a perfectly formed circular spot of light. Built out from this diaphragm is a metal box containing the curtain dissolve which operates two 8x10 pieces of graduated clouded mica, one upper and the other the lower half, both being operated toward one another by means of a revolving handle within easy reach. With this curtain dissolve it is possible to flood either the stage setting or the orchestra with any sized flood without resorting to various masks. The dissolving apparatus being designed to permit of the gradual flooding of the stage setting while the house lights are being correspondingly dimmed, thus producing a beautiful and impressive lighting effect.

A color frame is built in the spotlight opening on the front wall of the room, in which the various color frames are operated in such a way as to permit numberless tints of color schemes to be worked.

A feature of both this spotlight and special stereopticon is the system of counter-balancing which has been employed and which allows the machine to be pitched at any angle without recourse to the usual loosening and tightening of set screws to gain this end.

Instead of the usual swinging table a special lamphouse base was designed which is attached to the upper part of the pedestal, being pinned across in order to allow for the pitching of the lamphouse. To one side of the lamphouse base is located the balancing arm which extends downward and on the end of which are placed the counter-weights.

On the reverse side of the pedestal is located the operating clamp which grips the quadrant base beneath the lamphouse bracket. This clamp is a highly polished handle about 6 inches long providing for a generous grip and is so constructed that when loosened and the lamphouse is pitched to the desired angle, it will, as soon as released, drop of its own weight and lock the entire spotlight into the required position, leaving the user free to use both hands for the operation of color effects and spot manipulation. Ball bearings are employed for swinging both the spotlight and stereopticon on their pedestals and also in betweeen the collars of the locking clamp.

The stereopticon, which is built along the same lines as is the spotlight as regards pedestal, lamphouse and operating arrangements, contains a very original feature. This is in the form of a half size lens which is mounted upon a carrier operating upon two 3-foot long nickeled tracks. This lens is provided with a third lens combination which enables the user to obtain any size of picture by simply running the lens carriage backward or forward upon the tracks without in any way interfering with the definition or focus of the stereopticon picture. This stereopticon is used for projecting slides and various odd-shaped spots and color schemes upon the stage setting during the course of the performance.

In the rewinding room there is a specially constructed and designed motor automatic control rewind which rewinds the film in an enclosed casing, and which is provided with a signal and stopping device which automatically stops the rewind in case of film breakage or other causes and notifies the projectionists of this fact at the same time.

The main switchboard is unique in that it is built three feet out from the front wall, enabling the electrician to walk behind it in order to put in the fuses, the blocks for which are located in the rear, giving the entire front of board over for the switches. On this board are located a switch for each machine in the room, together with small switches for operating the arc control motors and the main service switch which is rated for 500 amperes. A special magnetically operated remote control panel is also located in the projection room which enables the projectionist in case of emergency to snap on every house light in the theatre at one touch.

In Mr. Newman's office is located a branch line speedometer, which is mounted over the desk and is connected with the projection room speedometer, which enables Mr. Newman to tell at a glance at what speed the pictures are being shown. A fully equipped and heavily built galvanized iron vault or cabinet is located at one end of the projection room for the storing of film.

A unique feature of the Newman Theatre is the little theatre located in the basement. This has a seating capacity of 200 and was planned for the use of societies for private theatre parties. The occasion of this was the demand for private performances or the buying out of the entire main house, which is always objectionable as it interferes with the regular patronage. This theatre is as well appointed in its way as the main house and is provided with a completely equipped projection room containing two Type S "Simplex" projectors.

The Newman theatre was designed by H. Alexander Drake. The decorations were executed by Mitchel & Halbach Co. and the entire stage production lighting equipment, flood lights and music stands were installed by the New York Calcium Light Company. The equipment of the projection room and the "Simplex" projectors were supplied by The Precision Machine Co., Inc. The Automatic Ticket Selling & Cash Register Company supplied the ticket selling devices and the General Heating Company supplied the vento-floor diffusers used for the heating and ventilating.

NOTES ON ILLUSTRATIONS.

Church of the Blessed Sacrament, New York City.—There is a very practical side to the interior finishing of this church. While its color effects are soft and pleasing to the eye, the finishing material serves another purpose in that it has acoustic properties, being designed to partial absorb sound and to prevent echo and reverberation. This acoustic stone finish known by the trade name of "Amerock" is used in all the plain wall surfaces of the interior. Three shades of color are used in the material so as to give variation and prevent monotony to the eye. All of the vaulting, ribs and arches in the main and side aisles, and also in the large Sunday school room in the crypt of the church, are built of key-lock tile arching. All of this work was carried out by the Key-Lock Arch Construction Company, Inc.

The natural lighting of the church is soft and subdued due to the beautiful ornamental glass windows which were fabricated by Clement Heaton. The rose window is a particular striking piece of ornamentation, occupying the large vaulted space over the organ loft. The beautiful tracery of the design is featured in the exterior. The artificial lighting effects of the church are equally effective, and consists of a series of delicate wrought candelabra suspended by long rods from the ceiling vaulting and giving a properly diffused and soft illumination of the entire interior. The fixtures are designed to give maximum intensity of illumination directly over the seating while the light gradually diminishes and is lost in the high vaulting. These lighting fixtures were made by G. E. Walter, and the electrical contractors were the firm of Reis & O'Donovan, Inc. The floor tiling laid in an interrupted pattern adds to the general artistic effect of the interior, an dwas supplied by D. H. McLaury Tile Company. Extensive use is made of cut cast stone, both on the exterior and interior, and particularly careful work is evidenced in the sharply cut mouldings and delicacy of the ornamentation. Its free use is a great credit to the material and to the Benedict Stone Corporation, its makers.

Mr. Gustave E. Steinback designed this church, and it was built by John T. Brady Company. In addition to its artistic merits and substantial construction the church contains modern devices which are very creditable and speak well for the forethought of its creators. It is equipped, for instance, with a vacuum cleaner system which was installed by Allen & Billmyre Company, which in such a public gathering place is a most necessary equipment, but unfortunately not of frequent installation.

The All-America Cables Building at 89 Broad street, which was designed by Warren & Wetmore and built by John I. Downey, Inc., is a specialized office building which was particularly designed to meet the needs of the cable company. This building brings under one roof all of the departments of the company and provides for additional accommodation for the extension of service whic hwill come about when the new direct cables to Brazil are put in operation.

The electrical contractors were J. Livingston & Co., Inc., the plumbing was done by James McCullagh & Co., Inc., the ornamental iron work by Lieberman & Sanford Company, and the cement floors by Harrison & Meyer. Steel windows are used throughout, and are of a special type constructed by Winslow Brothers Company.

The plain and ornamental plastering was done by H. W. Miller, Inc. A. B. See electric elevators are installed. The interiors, while extremely plain in their finish and appointments, are designed to give the best of working quarters for the employes. The furniture throughout is of simple design, and planned for usefulness and comfort. The chairs in the offices of a serviceable type were built by the Sikes Company.

The Ford Motor Car Company's Plant, Kearny, N. J., is an extensive group of factory buildings which were designed by Albert Kahn and built by the Turner Construction Company. The construction is a combination of structural steel and reinforcing concrete, and the buildings consist of a series of connected bays giving large covered court areas provided with tracks and overhead traveling cranes for the handling of automobiles for export. By the use of platforms extending into the courts from the various floors it is possible to handle cased automobiles by means of these cranes directly from the various floors. The plant represents the most modern developments in handling and shipping facilities. The extensive fenestration makes a very high percentage of exterior surface of glass. The window areas reach from the ceiling to within a short distance from the floor, and are practically continuous along the sides, interrupted only by the space taken up by the main column at each bay. In the column construction Deslauriers column moulds were used. The cement used was Edison Portland cement, the testing of which was done by Robert W. Hunt Company. A. B. See electric elevators are used.

Book Reviews

ARCHITECTURAL DRAWING PLATES by Franklin George Elwood. Peoria, Ill. Manual Arts Press. Paper, Price, $.50.

This pamphlet of fifteen plates with a short explanatory note to teachers, presents the methods adopted by the author in his teaching. Under proper guidance, there is sufficient information presented to enable the student to prepare a full set of working drawings with details for the construction of a residence. There are detail plates of foundation, cornices, balloon framing, window and door details, dormer windows and gables, stairs and porch details. One part devoted to thumb nail plan study is interesting and if the student will realize and merit of the suggestion, it offers an opportunity to become efficient in arranging the plan of a house.

March

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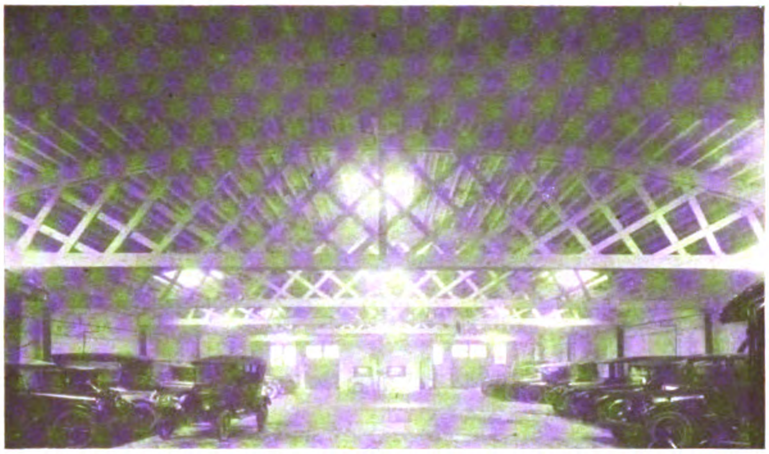

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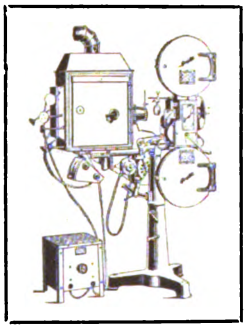

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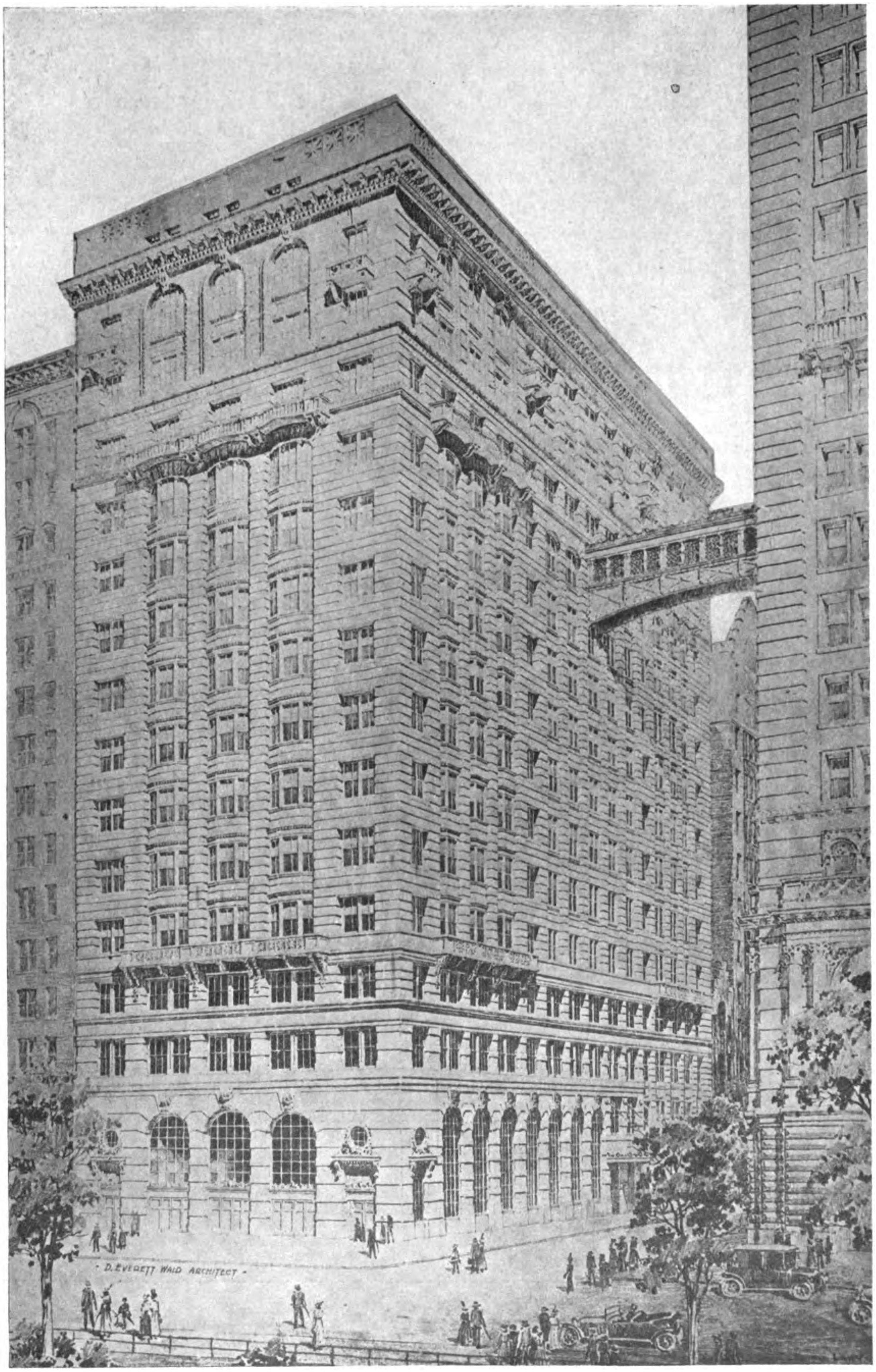


PERSPECTIVE VIEW, NEW ANNEX OF THE METROPOLITAN LIFE INSURANCE CO., TO BE ERECTED ON THE SITE OF DR. PARKHURST CHURCH, MADISON AVENUE AND 24TH STREET, NEW YORK CITY.

D. Everett Waid, Architect.

To be erected by The George A. Fuller Company; building and mason materials—Empire Brick & Supply Co.; glass—Joseph Elias & Co., Inc.; copper covered window frames and sash—Reliance Fireproof Door Co.; Frink reflectors; Grant overhead sash pulleys; plumbing and heating—W. G. Cornell Co.; steel frames and sash—Winslow Brothers Co.; sectional sash weights—Sanborn Sectional Weight Co., Inc.

ARCHITECTURE AND BUILDING
A Magazine Devoted to Contemporary Architectural Construction
WILLIAM P. COMSTOCK
Managing Editor

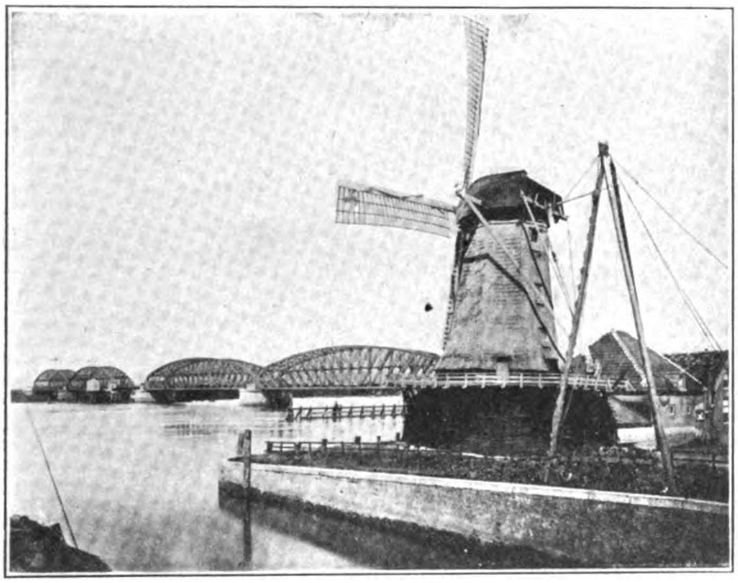
Volume LII MARCH, 1920 Number 3

WINDMILLS, PICTURESQUE AND HISTORIC.

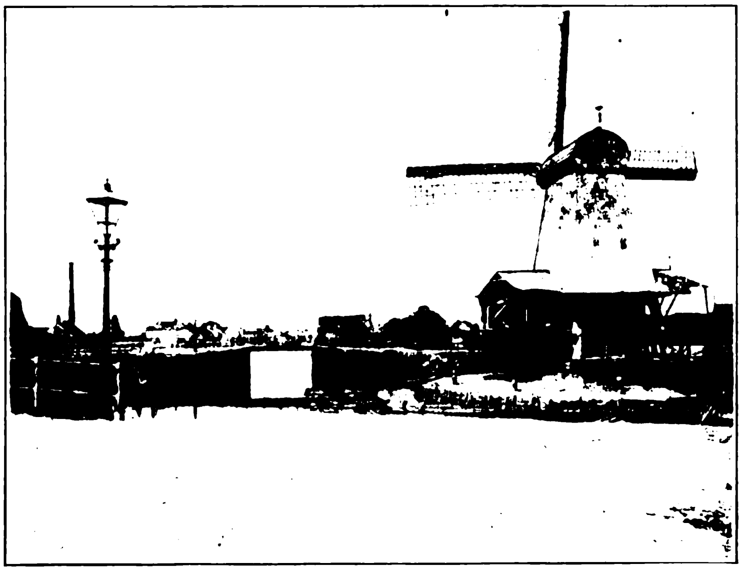
THE MOTORS OF THE PAST II.*

Turning now from the mechanical side of these old mills, as above, it is interesting to note the varied forms, uses and characteristics as found in the diverse parts of the world, and in the variety of races where and by whom these old home-made motors have been used.

Holland is usually taken as the home of the windmill, but that is so only in the greater proportionate number there in use than elsewhere. It is not true as regards origin nor the best development of them. It is a country notably flat, without water power, on the sea coast, and requiring great pumping equipment for draining, etc. This early resulted in the great number of windmills there found and associated with that little kingdom. It is said that in early days there were 10,000 of them. The greater number of them were used for lifting water to drain the "polders," or meadows or lowlands, through the medium of a scoop wheel or Archimedes screw. Some of them can yet be seen and in use, with fat Dutch babies apparently ever on the edge of falling in the sluiceways, yet never doing so. Nearly all of these mills have been replaced by great steam-driven government pumping stations. For sawing wood, also, great numbers are yet used in the Zaandam district, where several hundred can be seen almost adjacent, a vista and forest of windmills. And in the heart of the chief cities one yet sees, here and there, an oldtime brick tower mill, probably 200 years old—a family heritage, with its clean and trim curtained little Dutch windows, its individual name, as of a ship, such as "The Admiral" or "The Parrot," over the door, and its old coat of arms and carvings and touches of color. For the Dutchman is fond of his substantial woodwork, and of his bits of color; and such find expression in his mills, where carving like the stern of an old galley and color stripings of all the rainbow are both tucked in and flagrantly added.


THATCHED TOWER PUMPING MILL. HOLLAND.

The characteristic of the Dutch mill, is, however, that of a thatch covering, both on sides and top, on the usual size common mill—something not found in any other country. It is said of them that there is also a code worked out—sort of wigwag or semaphore system—so that by the position of the vanes as left when shutting down, the long-distance observer can read whether a carpenter is needed or a baby has been born, etc., etc. Certain it is that the mills make fine elevations for flag-flying on holiday occasions, for then the staunch colors of Holland will be found on the flagpoles atop the most of them. In noting the Dutch mills, one cannot overlook—nor wants to—the picturesque little "petmolens" or "jaskers"—diminutive post pumping mills, for small fields only—that, with long, slender vanes, seen through the haze or afar, almost


SAW-MILL; TURNTABLE TYPE. HOLLAND.

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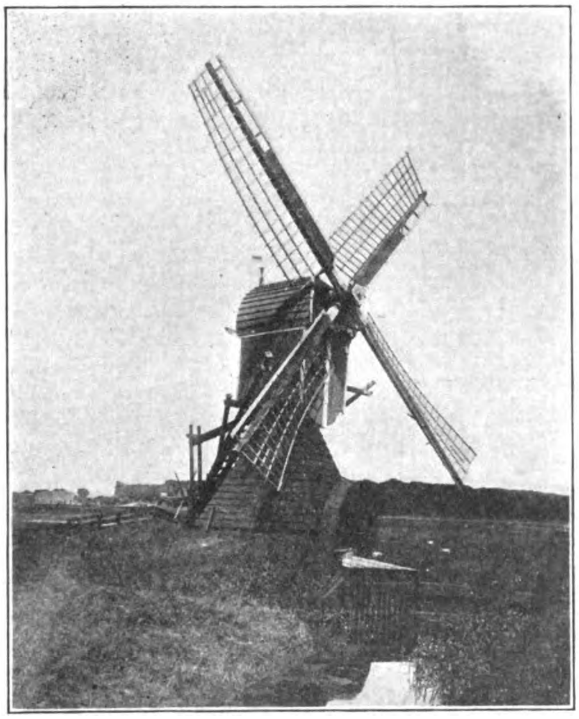
* Presented at a meeting of the Mechanical and Engineering Section of the Franklin Institute of the State of Pennsylvania, Philadelphia, held Thursday, March 14, 1918, by F. H. Shelton, Member of the Institute. Reprinted from the Journal of the Franklin Institute by courtesy.

suggest one of the old rocs from Sinbad the Sailor, caught in the act of alighting.

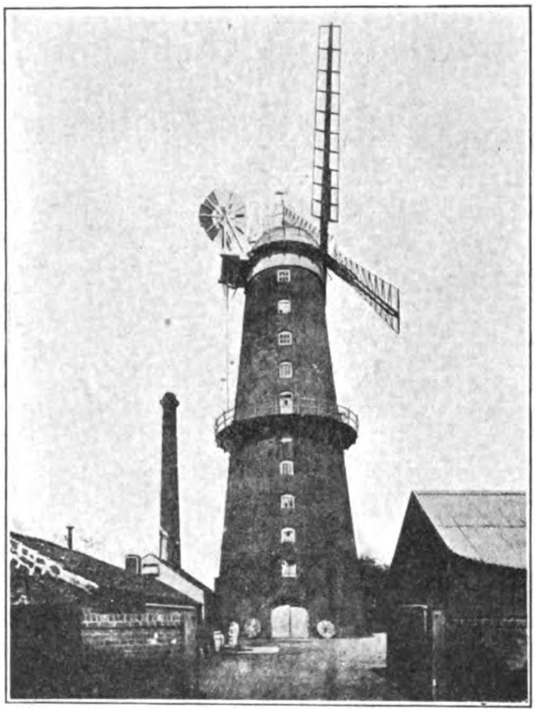
England, while numerically far inferior to Holland, is yet far in advance from the viewpoint of the fullest engineering development of this world's motor, as may be gathered from what has been said above as to the automatic shutters, tail vanes, etc. The largest, the most varied and the most efficient are found there. Many fine examples of these mills can be seen, a few of which are still in operation. In the south of England there are plenty of old wood structures of all forms—of which the turret is perhaps the most locally characteristic. This is a huge, or at least large size, post mill, often for some fine estate, with the base enclosed with a circular low or one-story building, used for storage, so that the external effect suggests a turret. In central England a good number of the tall brick tower mills yet stand.

For picturesquesness, however, no country surpasses old France. There the mills are small; the huge, towering structure of the Dutch and English is unknown. But one can find many of great antiquity, great variety of form and of great charm. The type seems to be the true cylindrical tower—not tapering—with the cone top. In the racetrack at Longchamps, near Paris, is an instance, while on the golf course at St. Lunaire, overlooking the sea coast, on the Channel, as in innumerable other places in the northern part of France, these little sentries of the past can be found. Picturesque as they are, however, they are not yet as much so as even an older and cruder form suggesting an old blockhouse. For above the stone first story is an overhanging wood second story, as so well instanced at St. Briac. And in the Loire valley are the very unique hybrid mills with the folding boards vane arrangement, already referred to, which at Saumur date back to 1682, as doubtless do the others of that not-to-be-found-elsewhere form.

Of old post mills of the usual wood form France has plenty, of which the one on top of Montmartre, in the Moulin de la Galette grounds, is perhaps the most prominent. It is one of the two or three remaining that were part of a dozen or more that crowned that hill in the early days, as shown in several views of old Paris. What changes it has seen in its 600 years of accredited age! In its timbers are shot and balls of the revolutions of 1814 and 1871. Within are the old bells and bunks and shrines of the generations of millers who operated it, one of whom is said to have been killed and quartered and hung on the four arms of his own mill by the successful assailants. In the same premises is a dear little miniature mill, which, with diminutive stones of but 18 or 20 inches in diameter. was used for grinding spices, in place of the usual grain for bread.



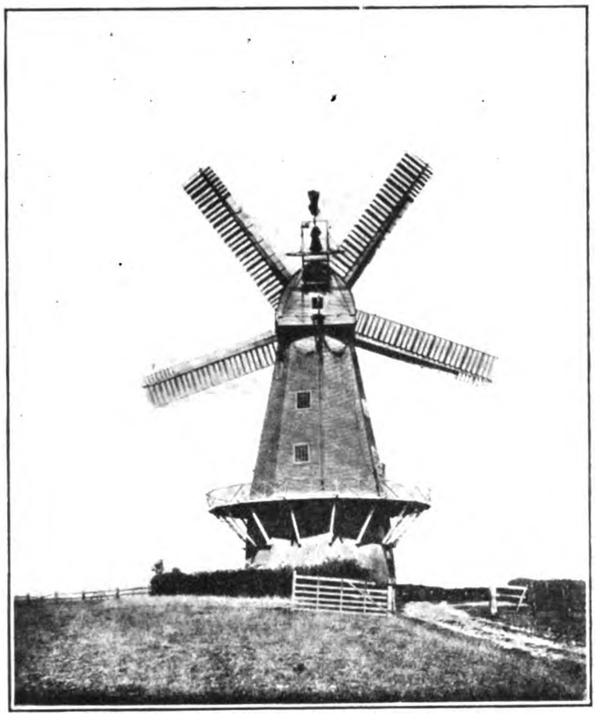
"PETMOLEN" OR SMALL PUMPING MILL. HOLLAND.



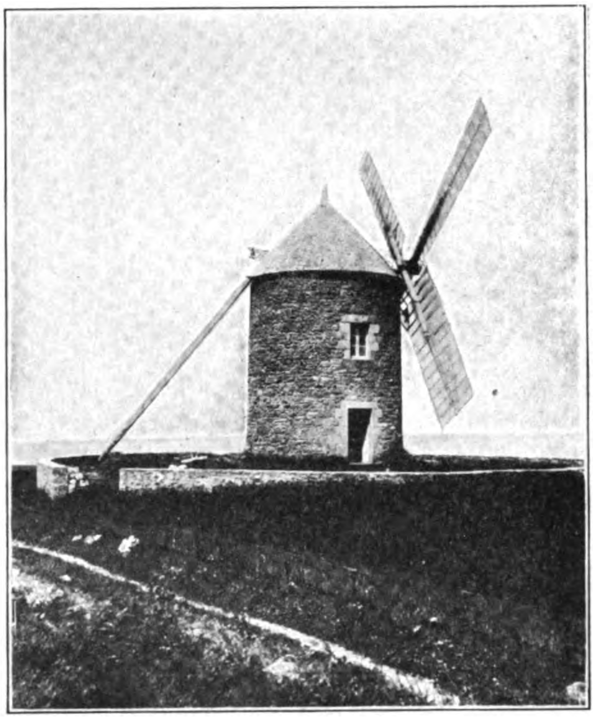
BRICK TOWER MILL; LARGEST BUILT. GREAT YARMOUTH, ENGLAND. (WITH CUBIT'S TAIL VANE.)

In Belgium we find, in the main, the post and tower mills of Holland and the Netherlands; while in Germany, as well, the similarity to the Dutch mills is the only or chief characteristic. In Denmark and Sweden and in Iceland are the usual mills of this section, excepting that their octagonal, typical squatty grist mill nearly always has the Turk's head top instead of the irregular shape of Holland and Germany. And so pronounced is that that in Lawrence, Kan., where a mill was erected in 1858, with a Swedish top, inquiry develops that it was by Swedish emigrants. Iceland can claim probably the most northern mill ever erected, for in Reykiavik, a little isolated town of about 3,000 inhabitants, we find an old mill, probably the first and only motor in the early days in Iceland.

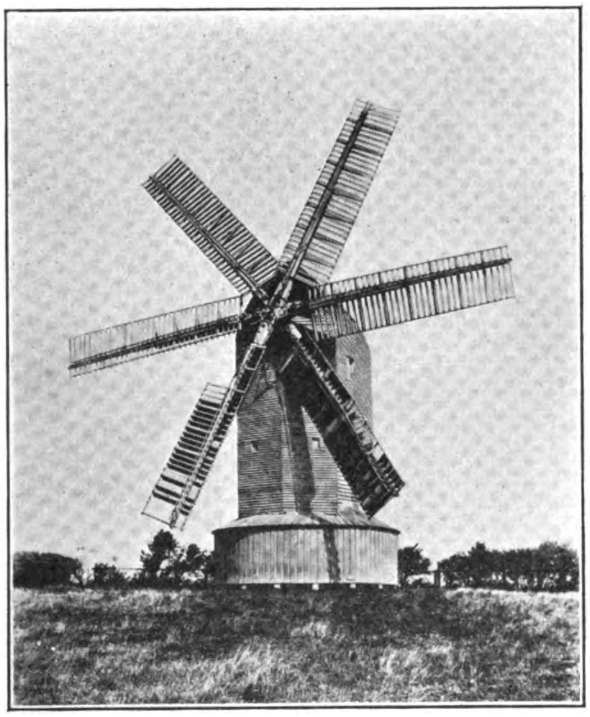
There is greater picturesqueness—but, as usual, accompanied with less efficiency—in the southern part of



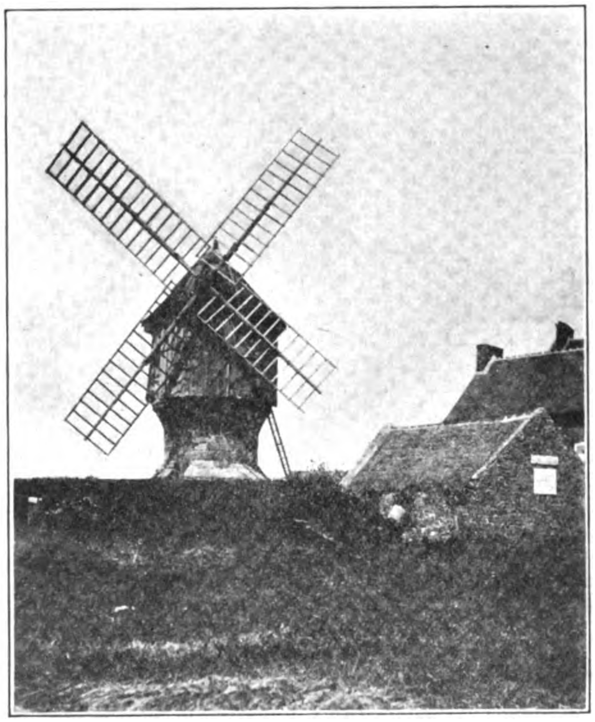
TOWER GRIST MILL. SOUTH OF ENGLAND.



TOWER MILL AND TAIL BEAM. ST. LUNAIRE, FRANCE.



TURRET POST-MILL. SOUTH OF ENGLAND.

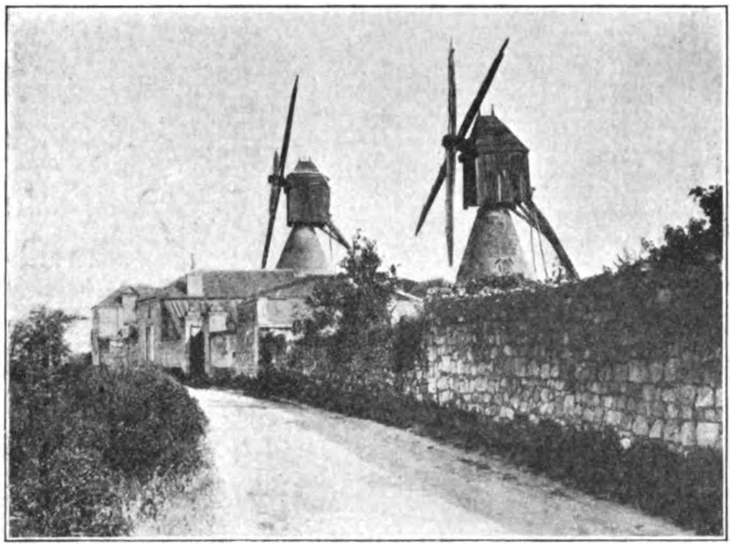


TOWER MILL; DOUBLE SWEEPS. ST. BRIAC, FRANCE.

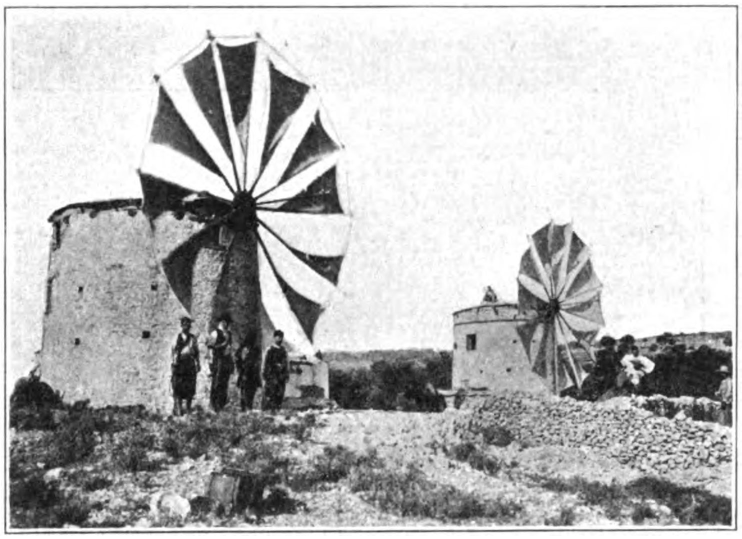
Europe, as, for instance, in Spain. Here, aside from the jib flying mills of the Mediterranean, we find primitive construction, crude devices and even the clay water bottles, or jars, bound to a cumbrous wheel, slowly turning over by wind power, for lifting water for irrigation, similar to devices seen on the banks of the Nile—although there operated by oxen. And in Spain we tread the country where the ever immortal Don Quixote, despite the adjurations of the faithful Sancho Panza, charged at full speed a flock of windmills on the plains of Montiel.

The crude structures of Greece and Turkey, already mentioned, are so crude that often no device is provided for turning to the wind, but, on the contrary four mills are sometimes built in a field, facing, respectively, north, south, east and west; so that whichever way the wind comes some power can be secured It is, however, more likely that prevailing winds are so constant from one quarter there is but little use for a turning device, resulting in its omission.

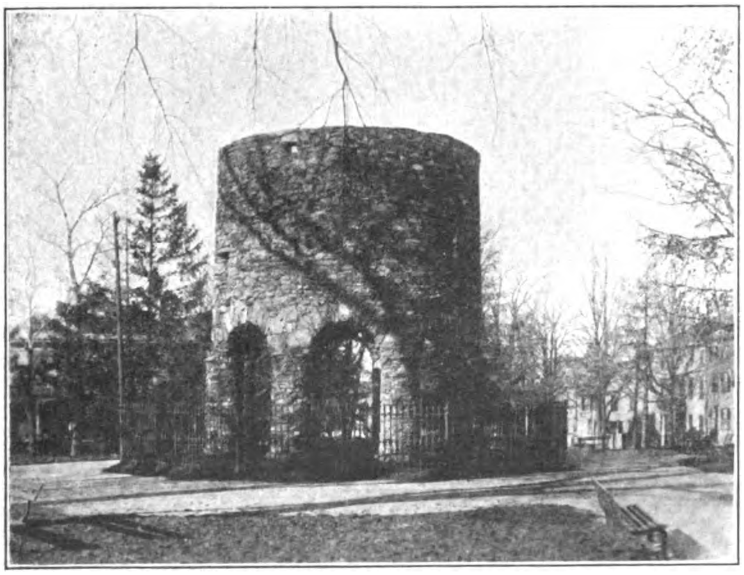
And so one can go the world over and find these old mills; to the Barbadoes, where they are still extensivel,



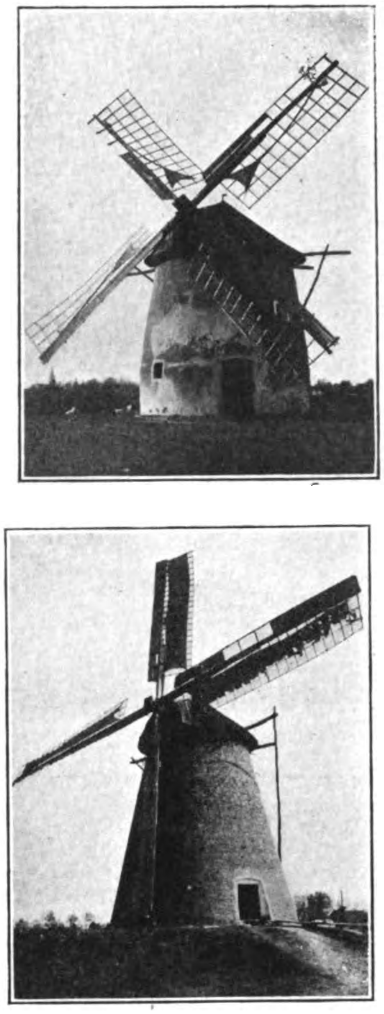
HYBRID TYPE OF GRIST MILL, 1682. SAUMUR, FRANCE.



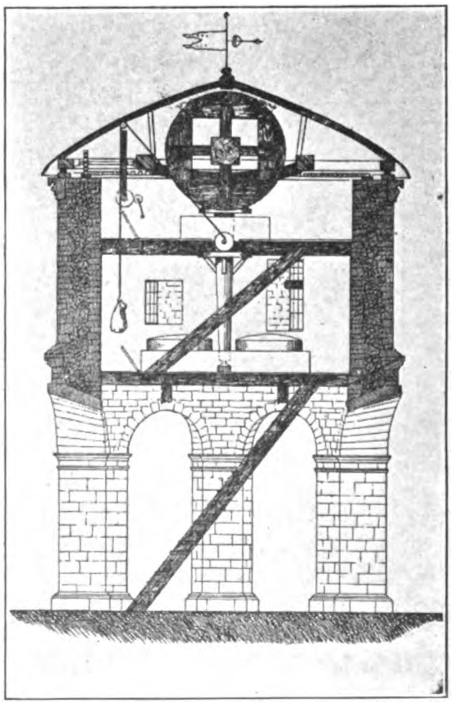
MULTI-JIB TOWER MILL. SAMOS, TURKEY IN ASIA.



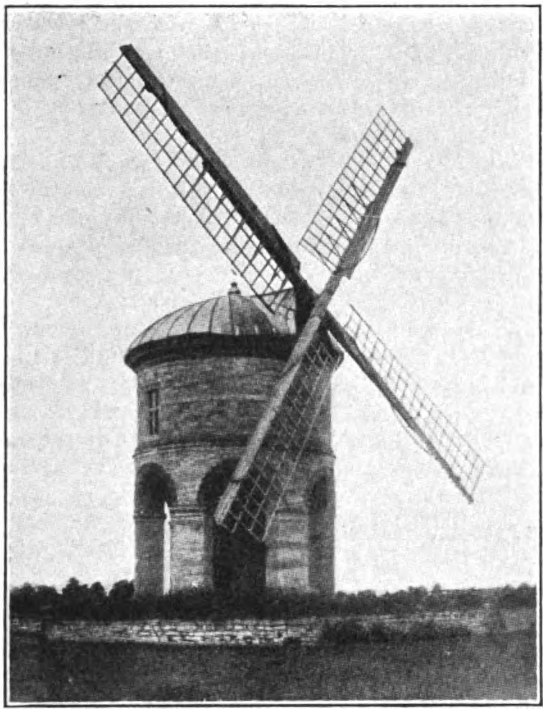
TOWER OF THE OLD NEWPORT MILL, OF 1675, AS NOW STANDING. TRURO PARK, NEWPORT, R. I.



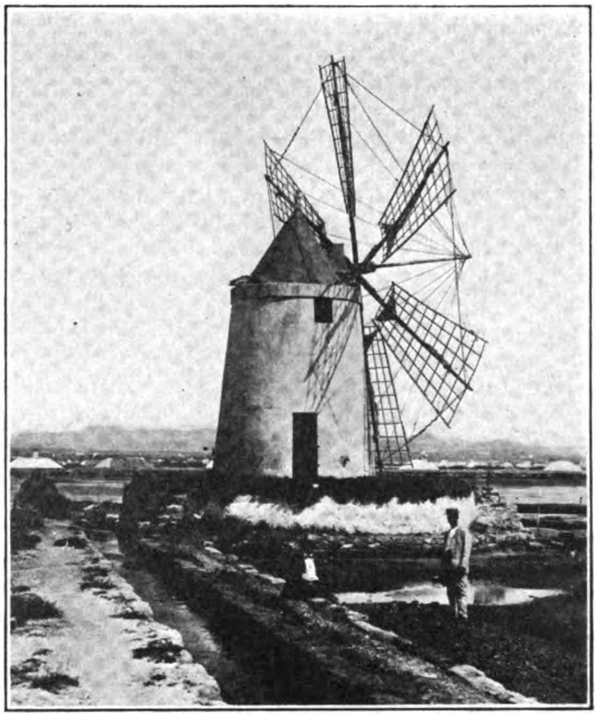
CRUDE FORMS OF TOWER GRIST MILLS; VICINITY OF BUDAPESTH, HUNGARY.



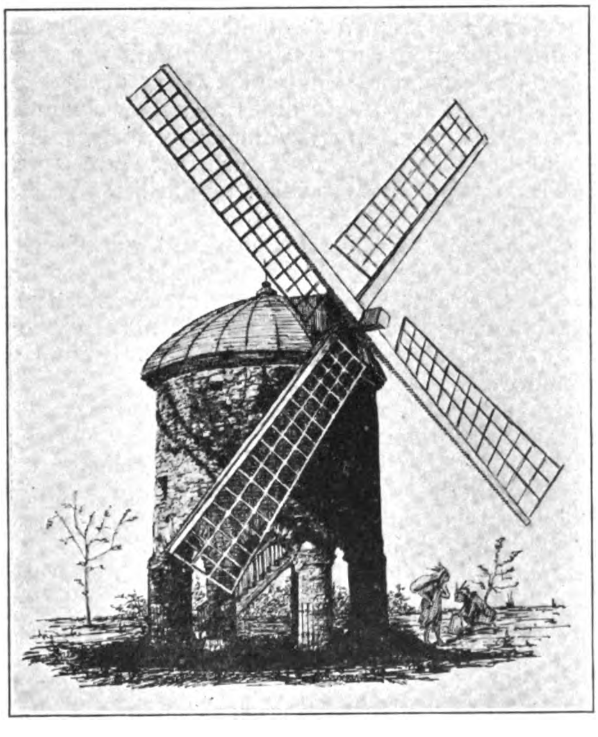
CHESTERTON MILL, VERTICAL SECTION BETWEEN COLUMNS.



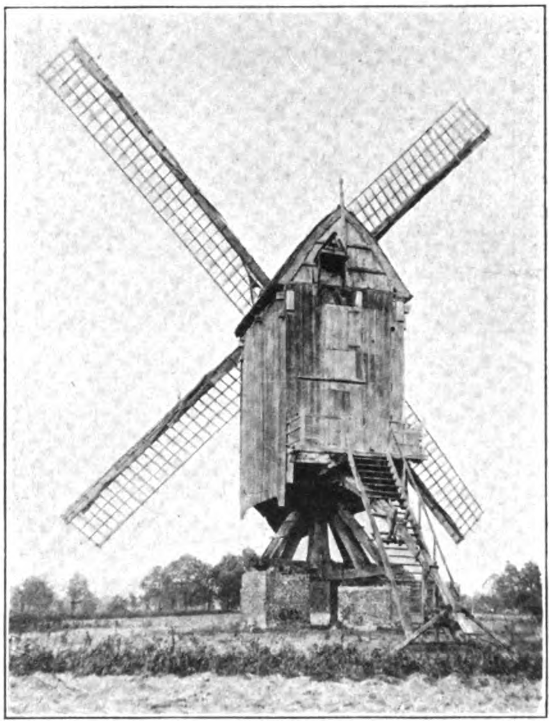
INIGO JONES-PEYTO MILL OF 1632. CHESTERTON, WARWICKSHIRE, ENGLAND.



TOWER MILL. TRAPANI, SICILY.



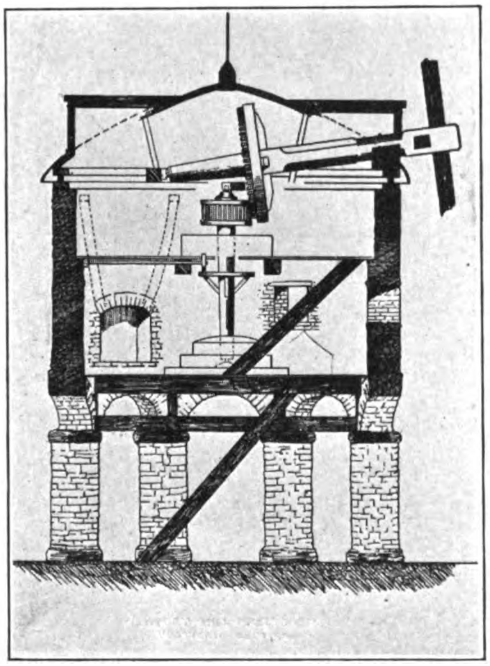
NEWPORT, R. I., MILL AS "RESTORED" OR PROBABLY CONSTRUCTED.



MID-EUROPEAN TYPE OF POST MILL. BELGIUM.

used—and of English type—for crushing sugar cane; to Jamaica, where they once were, as shown by an old print of the earthquake of 1792, in which several mills are depicted bodily upside down almost, as would be a child's toy; to Peru, where over 13,000 feet above sea level in the Potosi silver mining districts of past times—centuries past—old prints show mills of the manifest Spanish type operating stamps for crushing silver ore; to the St. Lawrence, where the early settlers, both French and English, left their imprint in the shape of old mills on several promontories and points; to southern Illinois, where the German emigrants of the 1820's and '30's brought with them the mills of the Fatherland, etc. In all quarters of the globe the world's chief motor for eight centuries can still be found.

And in closing this review of old windmills there is no instance to which reference should be made of quite as much interest as the old mill at Newport, known to every American antiquary and which, some two or three generations ago, was ingeniously ascribed to the Norse in the period of 1100 or thereabouts. This theory, while highly picturesque, was unfortunate chiefly in never having anything except surmise to back it up. Not a jot nor tittle of record or physical remains could be developed to substantiate it, and it has long since been practically dropped by most students of American history. And when the following, that has in recent years been developed, is borne in mind, there seems no vestige of reason left in the Norse theory. There is no question as to the following facts in relation to the Newport mill, and I speak with confidence, having in person surveyed and thoroughly investigated both it and its English prototype, as described:



NEWPORT MILL RESTORED, VERTICAL SECTION.

In 1675 Governor Benedict Arnold (the grandfather of the traitor) was in charge of the then early colony of Rhode Island. Sixty years before he had been born in the Warwickshire section, England, in which the Peyto estate was perhaps the greatest and finest. On that estate there was completed the most elaborate windmill ever built. Inigo Jones, England's great architect of that time, designed it, and it was unique in its open arch design, its finely chiseled stonework and unusual adornment. Young Arnold was a lad of 17 at that time, and the building of this beautiful and remarkable wildmill, in 1632, was, with small doubt, a marked episode in his life and knowledge. Forty odd years later, he, by the chance of fate, was the Governor of the Rhode Island Colony. With the destruction of a previous wood windmill of 1665, blown down in a great storm, it became his duty to provide another one for the use of the little colony. And there is small doubt, indeed, that in doing that he undertook to provide a mill that should be as nearly as possible a copy of the old mill at Chesterton, near Leamington—the best mill of which he knew. And so, without the measurements as to the general arrangement, size and design, from memory only, he there built, with the most limited facilities, a virtual replica of the Leamington-Peyto-Jones mill. In order to secure greater permanence and protection against Indian attacks the mill was built of stone instead of wood.

For, while of course the fine stone work and carving and detail are missing, in this colonial condition, the general dimensions, the design and the interior arrangements are in substance the same throughout. It needs only the comparison of the plans of the two—side by side—to be satisfied as to that. Governor Arnold's birthplace and connection afford the reason of the similarity, and his will even speaks of "my stone built windmill." This old structure, still standing—as to its walls—in Truro Park, Newport, R. I., is perhaps America's greatest colonial relic, and with its prototype of Chesterton constitutes the most unique pair of windmills, having the greatest historic interest, of any attaching to our country's windmill history.

F. H. SHELTON.

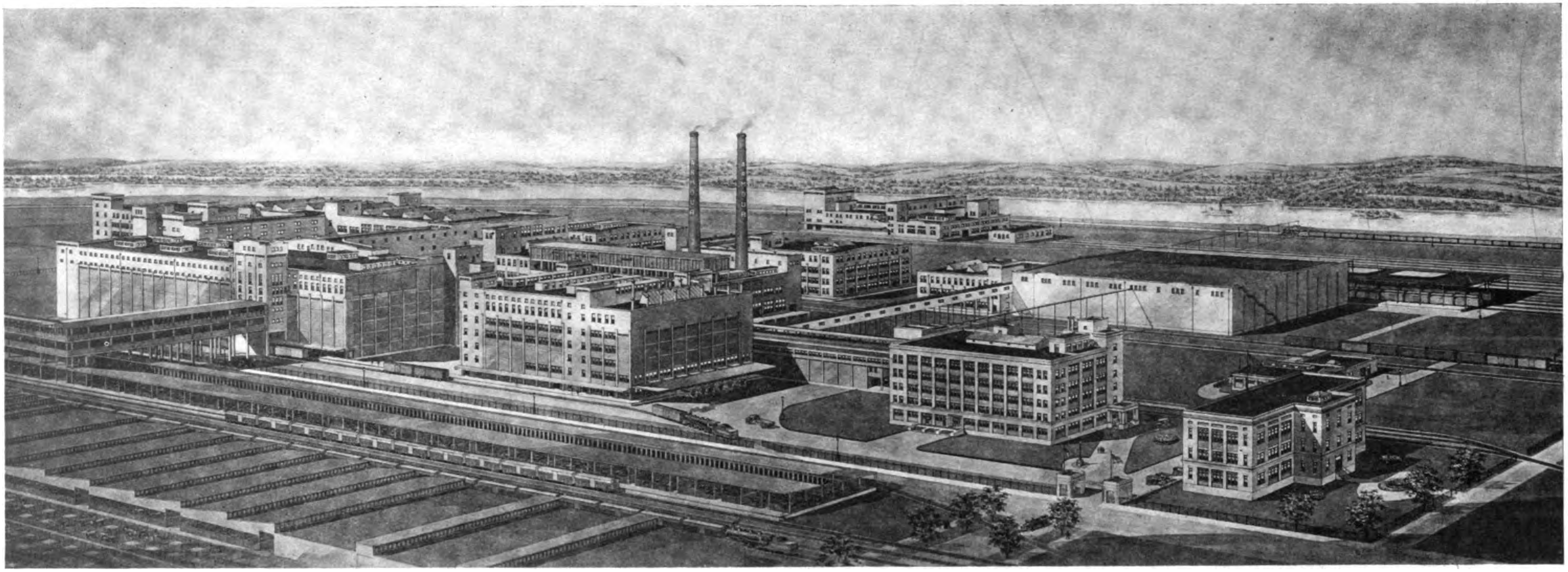
PACKING PLANT OF ARMOUR & COMPANY.

Built upon a site of fifty acres on the banks of the Mississippi River, the new packing plant of Armour & Company at South Saint Paul, Minn., occupies a position of prominence in the landscape and it may be said to the credit of the plan and design that this extensive group of extremely utilitarian buildings is far from an eyesore and a blot upon the landscape. The buildings are simply designed, very substantially built and grouped to meet the economic requirements of a packing plant organization. Railroad facilities and inter-communication between the buildings are important factors, but the grouping of the entire plant is such that there is no appearance of excessive crowding or the litter of a railroad yard. The entire plant is enclosed with a simple iron fence. The streets are well paved, the grounds in and about the buildings kept in order, lawns and flower beds adorn the approaches and open areas. The twenty-two structures which house the various units of the plant are all well proportioned and gain dignity from their very simplicity. To one side are the stock yards and stock sheds, which are open at the sides and well ventilated and are lighted by lantern skylights. A roadway and railroad siding separate the yards from the manufacturing portion of the plant. The power plant is located about the centre of the group of buildings and its two tall chimneys mark its position.

All of the live stock is taken over a bridge from the yards to the cooler building and is transferred to pens on the sixth floor by means of three large elevators, each having a capacity for a car load of stock.

From the sixth floor of the cooler building, the stock goes to the same floor of two connecting killing buildings. The floors are 127 feet wide and 337 feet long and are provided with galleries for visitors. The daily killing capacity of the plant is 7,500 hogs, 750 cattle, 1,000 calves and 2,000 sheep.

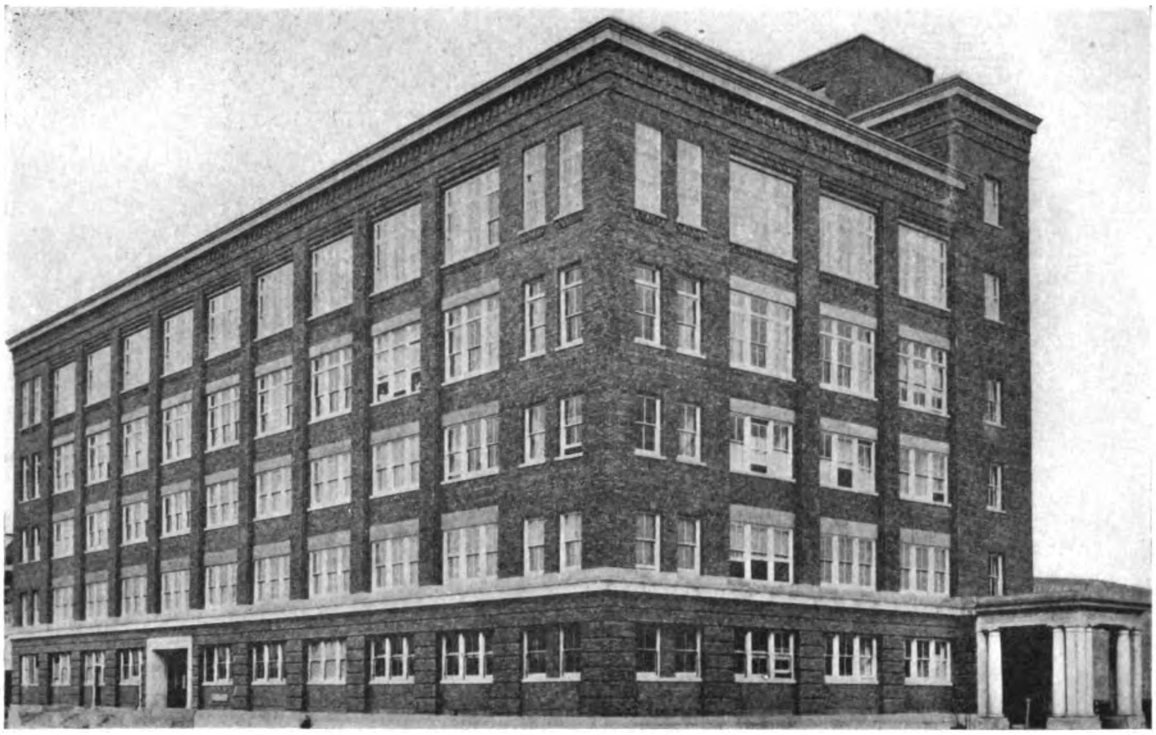
Spreading away from these main units of the plant are the various other storage and packing buildings where food products are prepared for the market. The total floor space of all of the buildings is 1,457,664 square feet, equalling 33.34 acres. The total number of employes is about 3,000 and the original cost of live stock slaughtered during the year represents an outlay of $90,000,000.

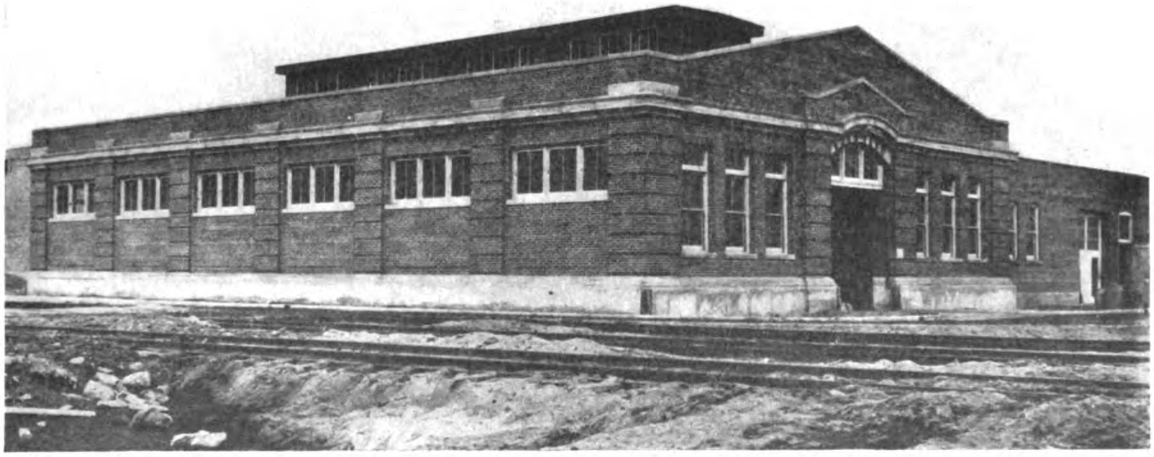


PERSPECTIVE VIEW, PACKING PLANT OF ARMOUR & COMPANY, SOUTH ST. PAUL, MINN.

R. C. Clark, of Armour & Co., Architect.
Allen McKenzie of Armour & Co., Engineer.

Architecture and Building. Plate 25.
Painting—W. P. Nelson Co.; central station night watch and fire-alarm service installed by American District Telegraph Co.; bloxonend flooring—Bloxonend Flooring Co.; cement—Carney's Cement Co.

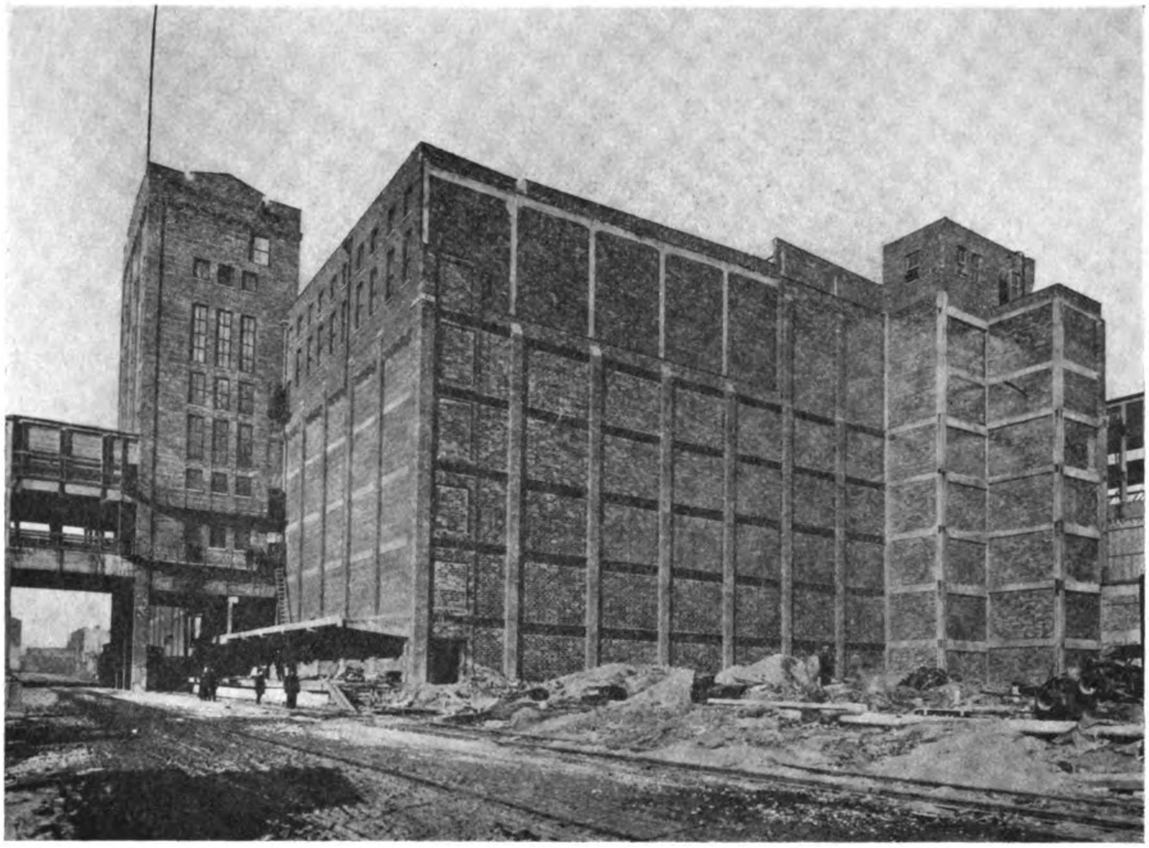


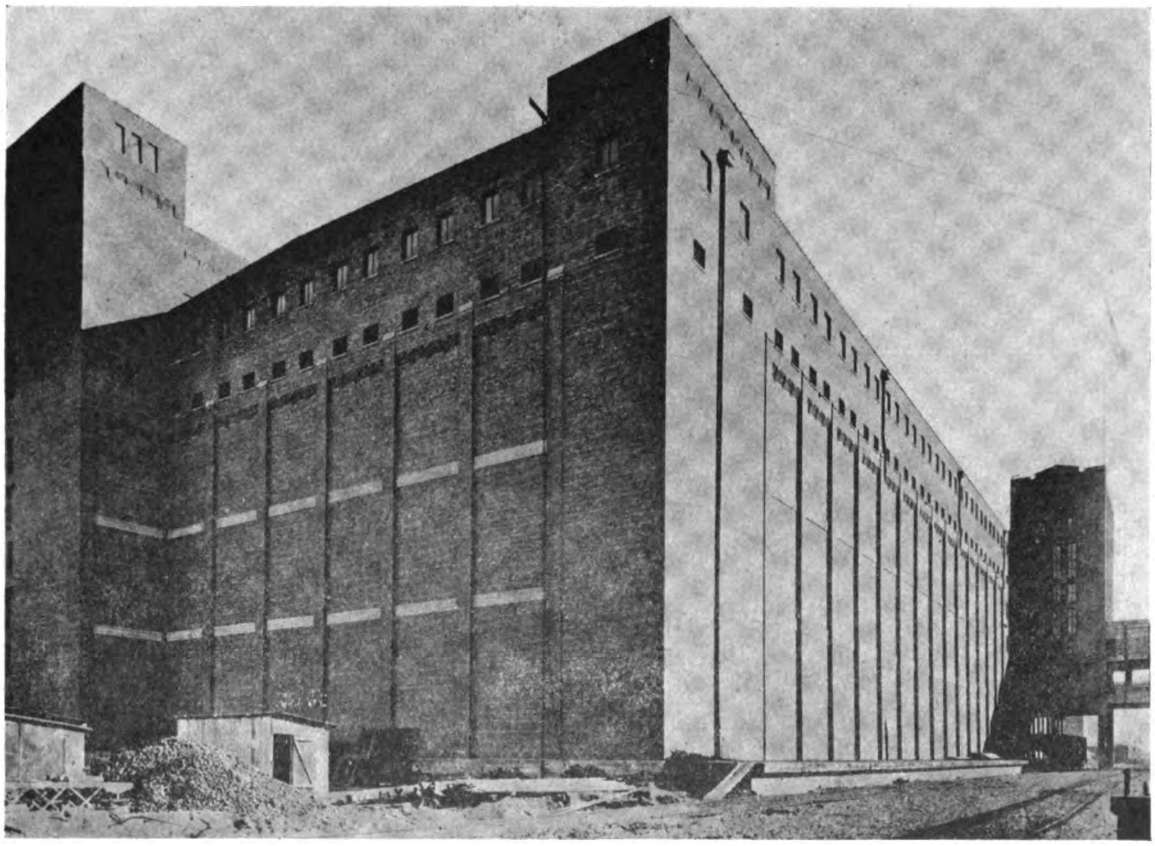


ADMINISTRATION OR SERVICE BUILDING, AND BUILDING, COMBINING GARAGE, STABLES AND BUILDING FOR CHARGING TRACTORS, PACKING PLANT OF ARMOUR & CO., SOUTH ST. PAUL, MINN.

R. C. Clark, of Armour & Co., Architect.
Allen McKenzie of Armour & Co., Engineer.

ARCHITECTURE AND BUILDING. Plate 26.
Autocall equipment—The Autocall Company; roof trusses for garage—McKeown Bros.

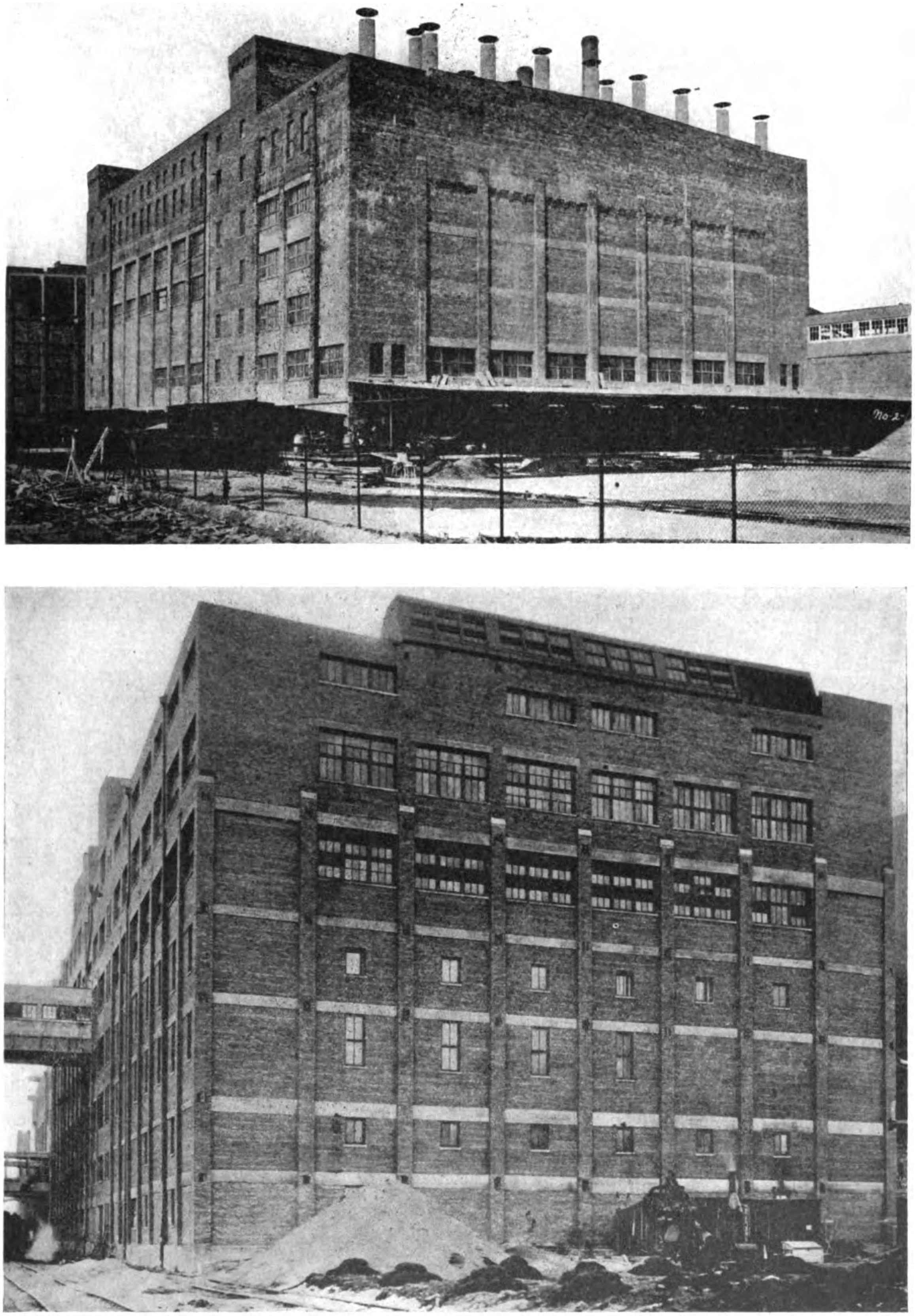




COOLER BUILDING FROM TWO ENDS, SHOWING LIVE STOCK ELEVATOR TOWER AND PROVISION PLATFORM, PACKING PLANT OF ARMOUR & CO., SOUTH ST. PAUL, MINN.

R. C. Clark, of Armour & Co., Architect.
Allen McKenzie of Armour & Co., Engineer.

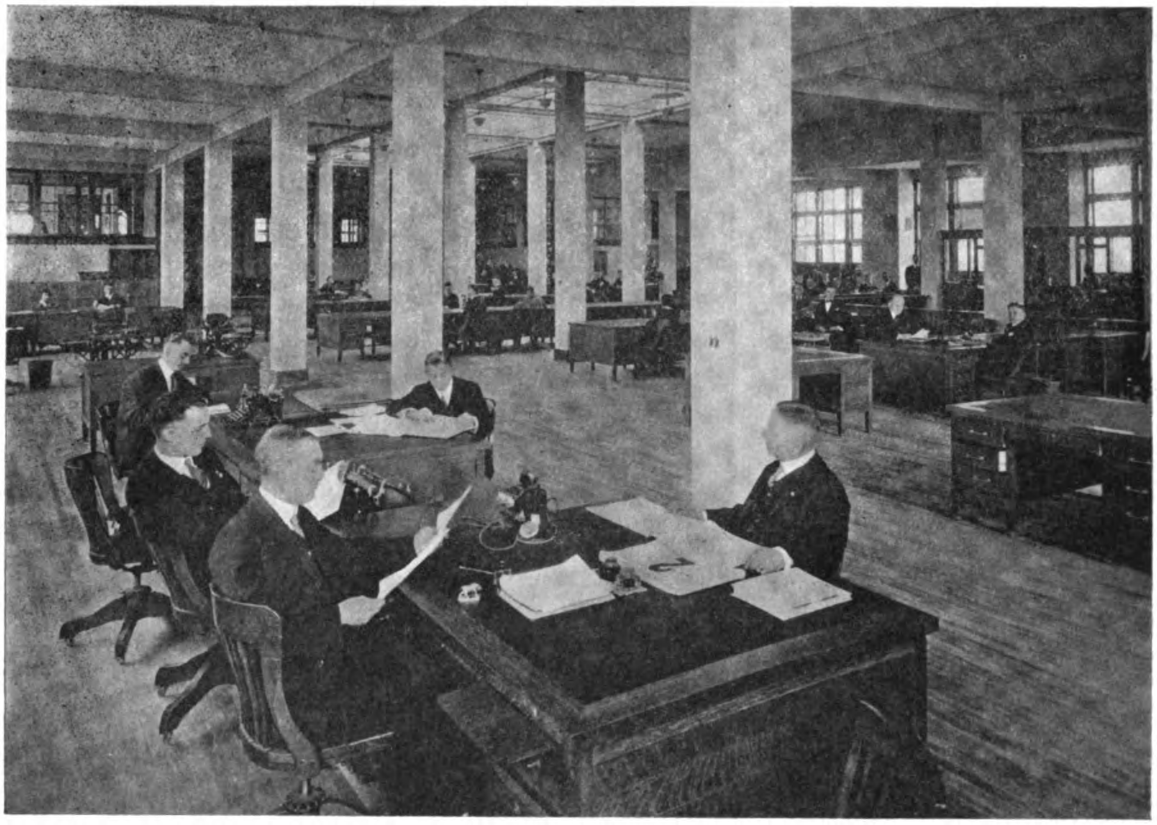
ARCHITECTURE AND BUILDING. Plate 27.
Quarry and ceramic tile flooring—George H. Rees & Co.; salt glazed tile—The Clay Products Co.; brick—Western Brick Co.; scales—The Standard Scale & Supply Co.; ice handling machinery—Gifford-Wood Co.; elevators—Kimball Brothers Company.

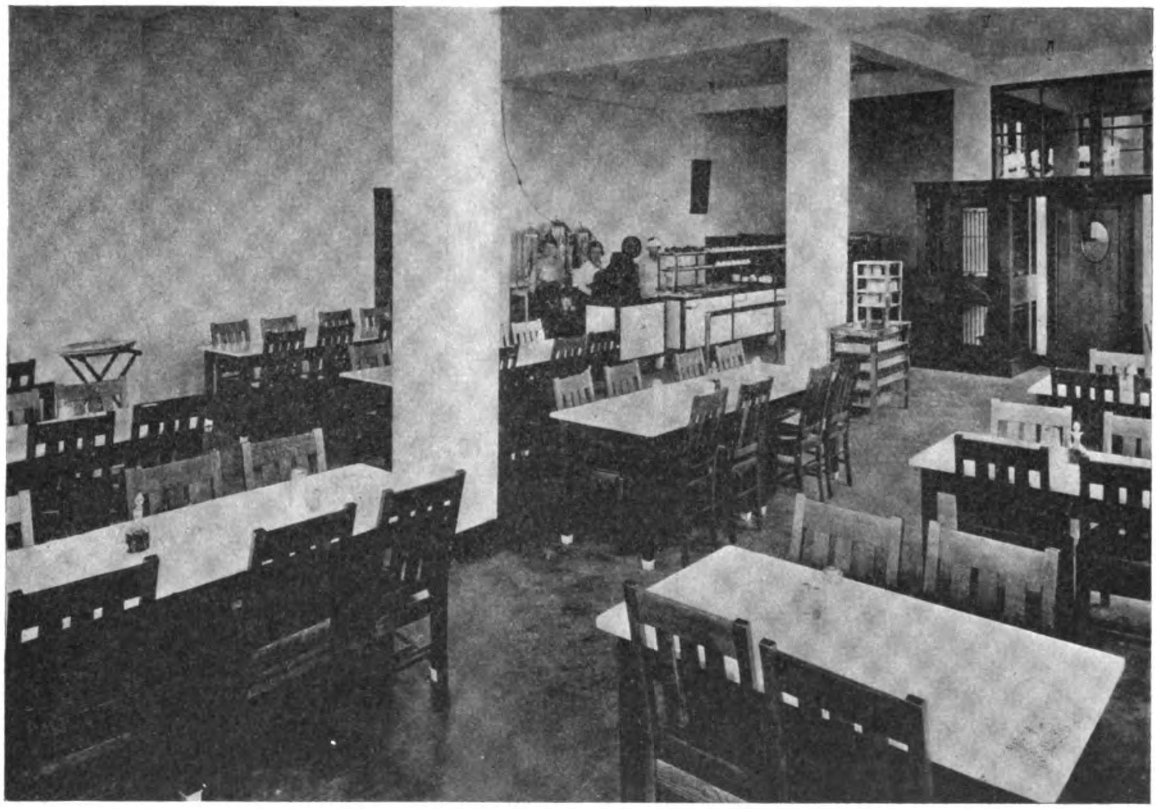


WHOLESALE MARKET, HAM HOUSE AND SAUSAGE FACTORY, AND THE KILLING BUILDING, PACKING PLANT OF ARMOUR & CO., SOUTH ST. PAUL, MINN.

R. C. Clark, of Armour & Co., Architect.
Allen McKenzie of Armour & Co., Engineer.

ARCHITECTURE AND BUILDING. Plate 28.
Scales—The Standard Scale and Supply Co.; ice handling machinery—Gifford-Wood Co.; hair dryers—The Philadelphia Textile Machinery Co.; bone and tankage grinders—Stedman's Foundry & Machine Works.

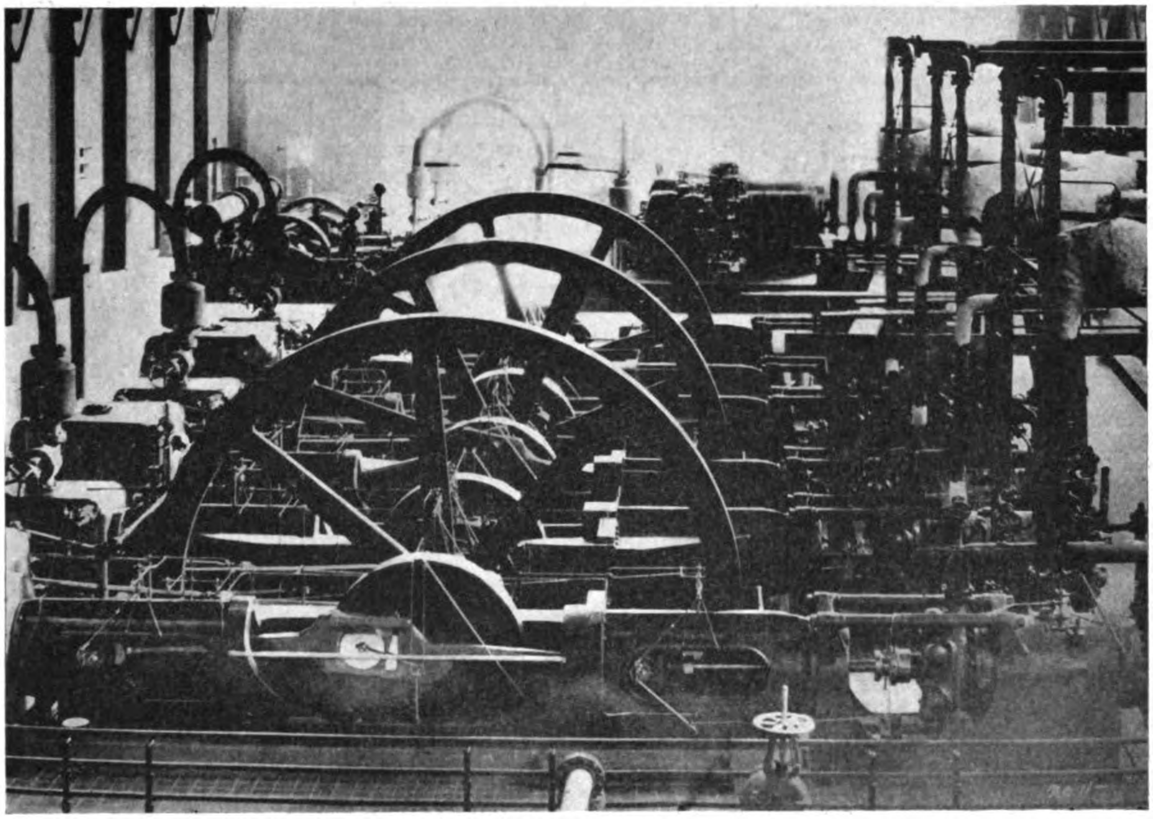


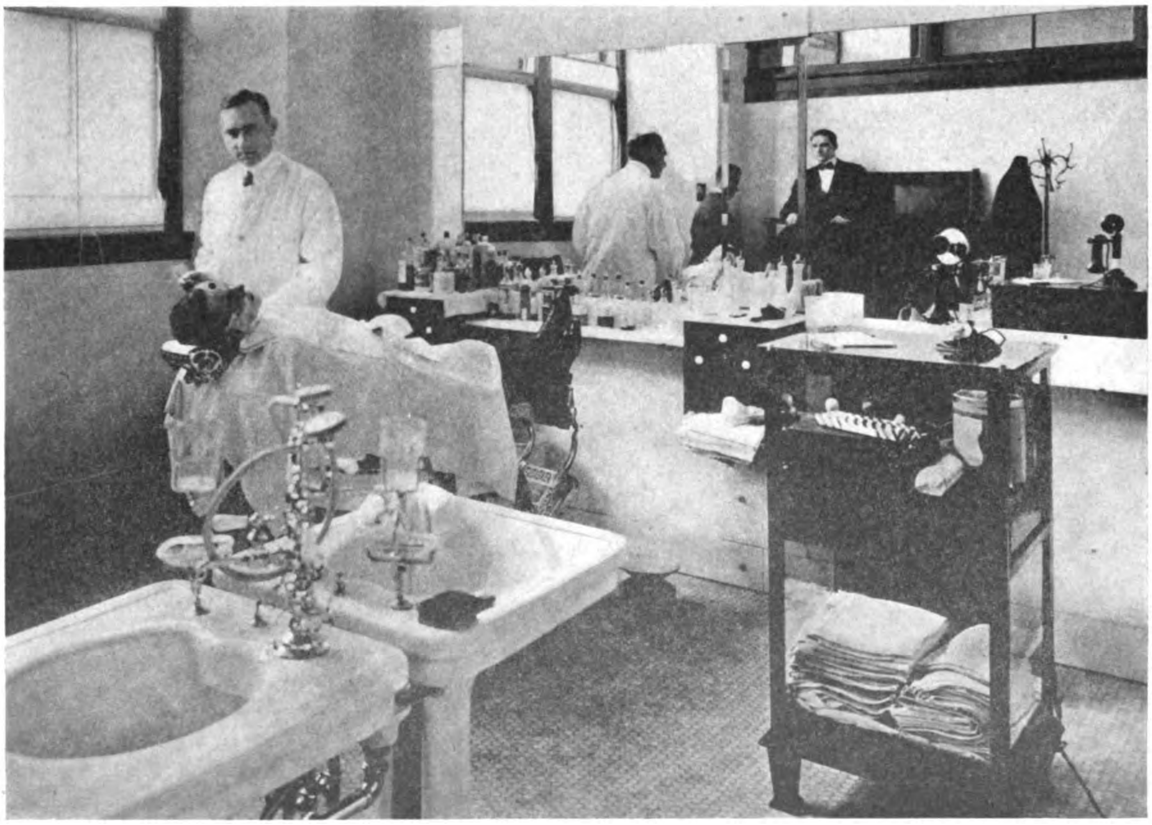


GENERAL OFFICES ON FIFTH FLOOR OF ADMINISTRATION BUILDING AND CAFETERIA ON THE FOURTH FLOOR, PACKING PLANT OF ARMOUR & CO., SOUTH ST. PAUL, MINN.

R. C. Clark, of Armour & Co., Architect.
Allen McKenzie of Armour & Co., Engineer.

ARCHITECTURE AND BUILDING. Plate 29.
Cafeteria and restaurant equipment—Albert Pick & Co.; office chairs—Milwaukee Chair Co.

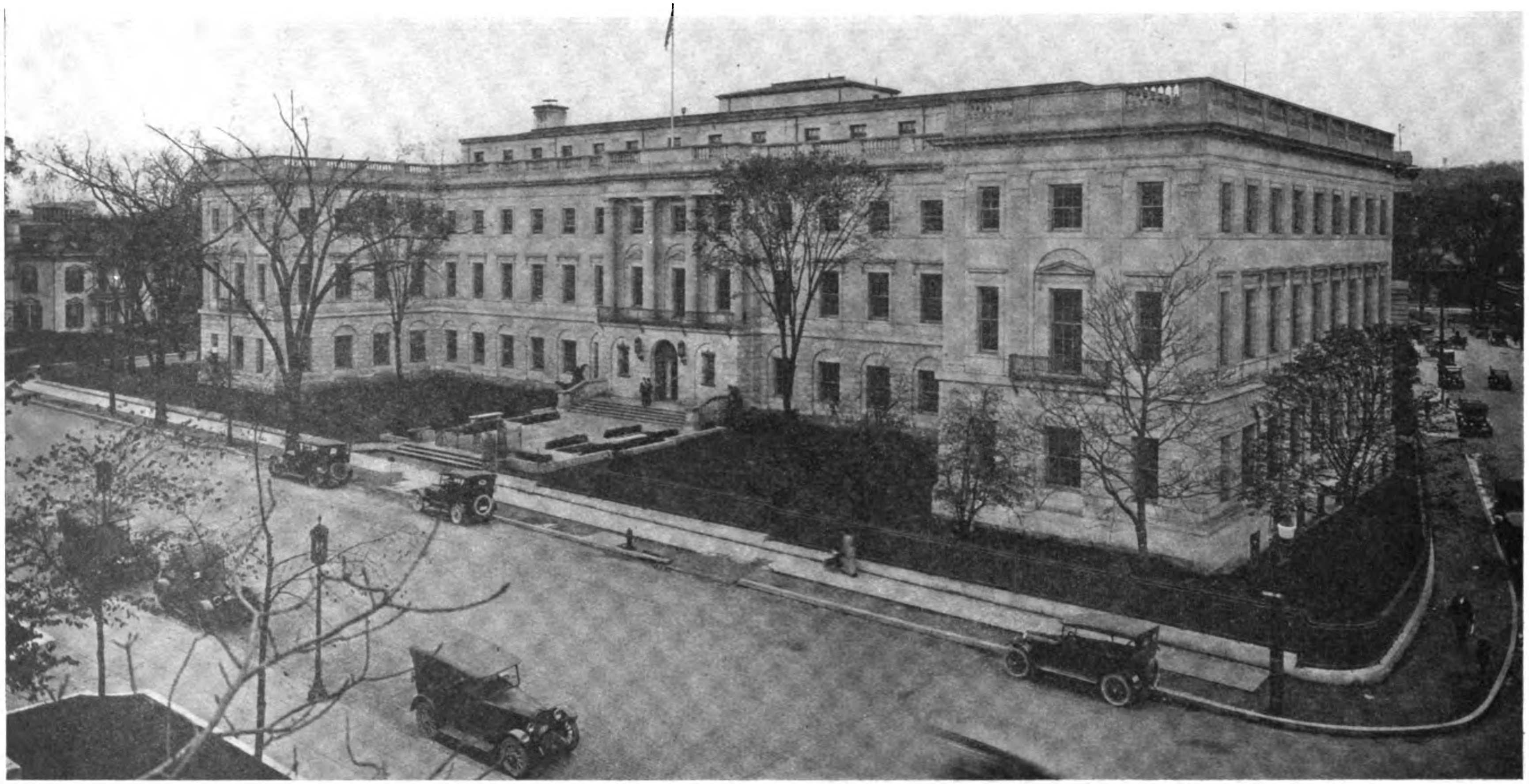




POWER HOUSE, SHOWING REFRIGERATING MACHINERY WITH ELECTRIC TURBINE GENERATORS, AND BARBER SHOP FOR EMPLOYES IN THE ADMINISTRATION BUILDING, PACKING PLANT OF ARMOUR & CO., SOUTH ST. PAUL, MINN.

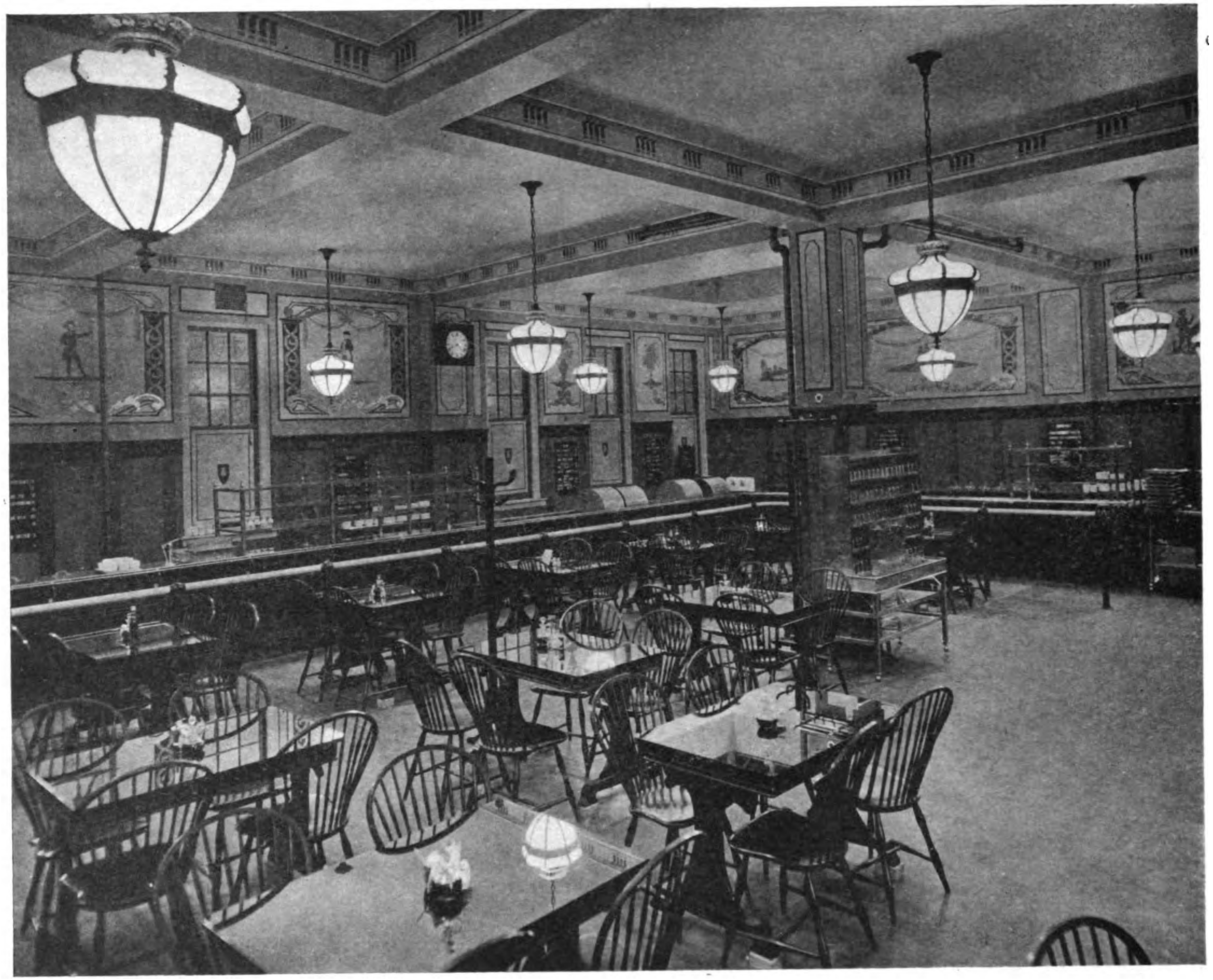
R. C. Clark, of Armour & Co., Architect.
Allen McKenzie of Armour & Co., Engineer.

Pumps and heaters furnished by Hodgart Company; refrigerating equipment—The Vilter Mfg. Co.; ammonia absorption machines—Carbondale Machine Co



CHASE OFFICE BUILDING, WATERBURY, CONN.
Cass Gilbert, Architect.

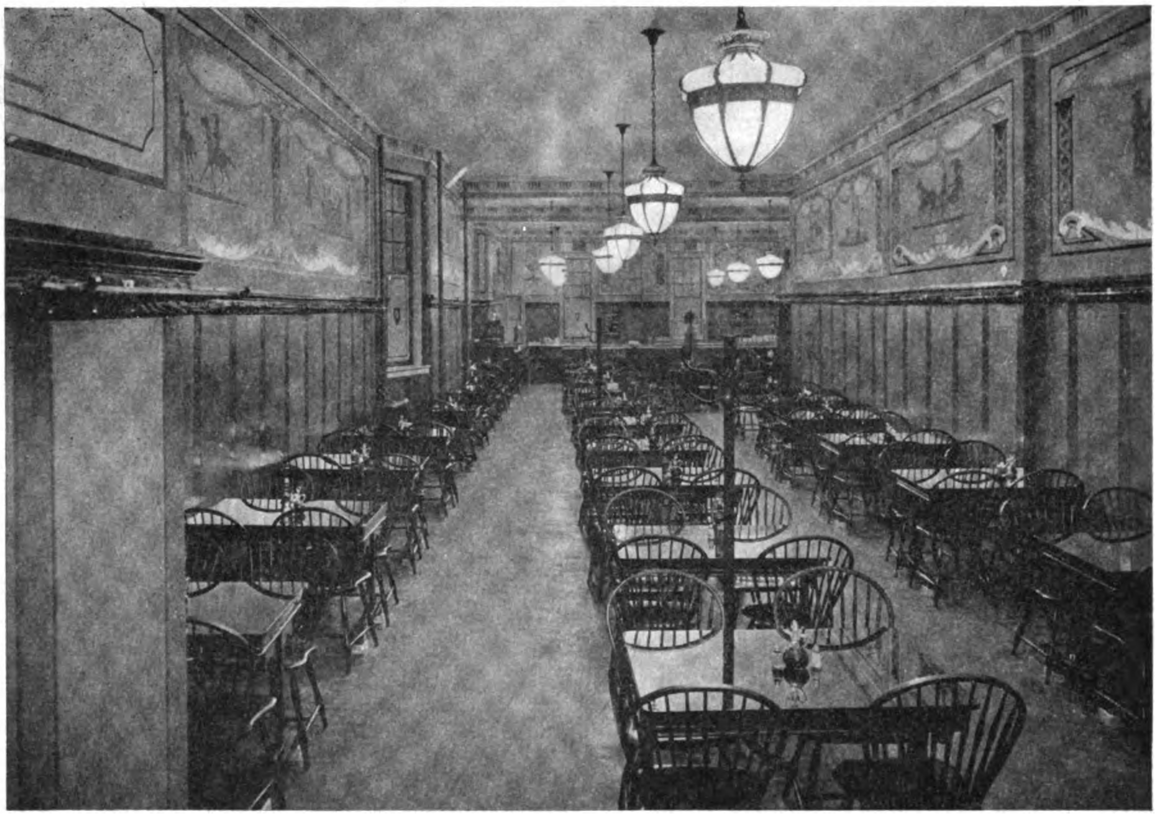
ARCHITECTURE AND BUILDING. Plate 31.
Built by Thompson Starrett Co.; electrical contractors—J. Livingston & Co.; Inc.; marble and tile—McLaury Marble & Tile Corporation; wrought iron fence —John Williams, Inc.

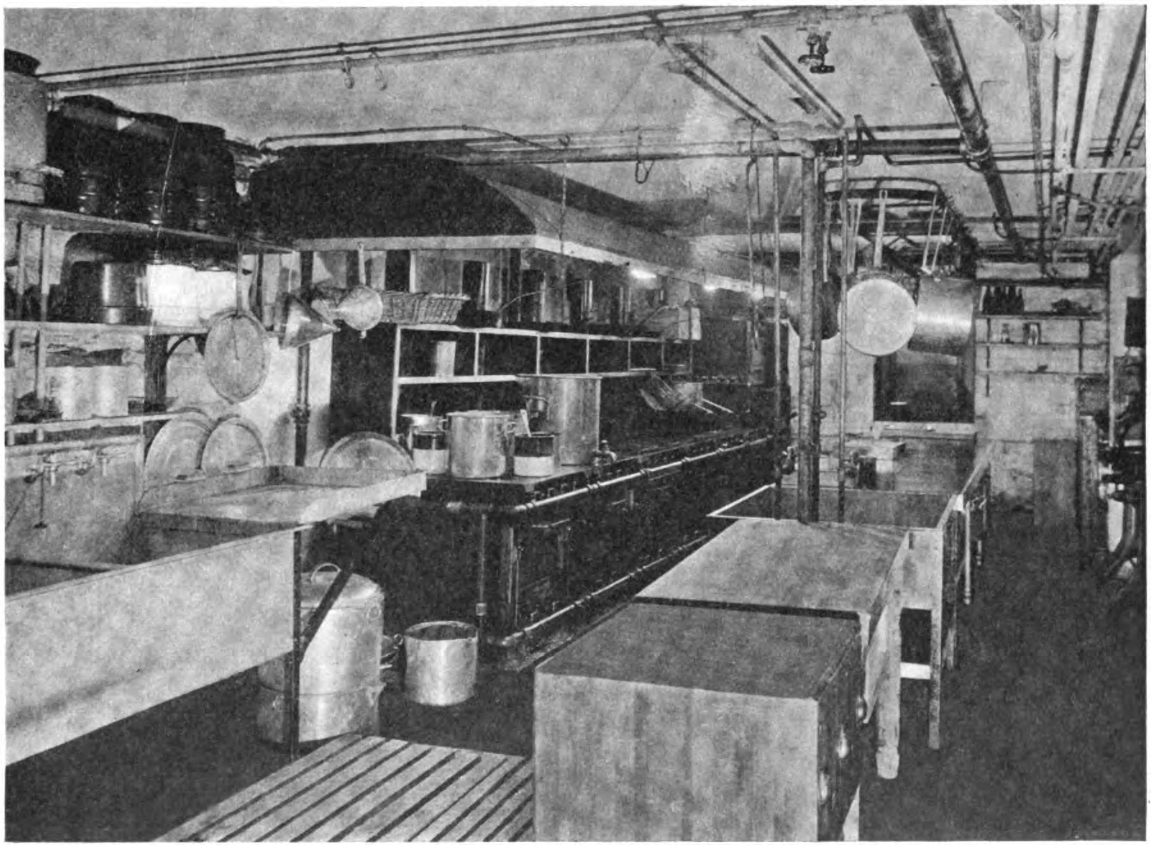


KNICKERBOCKER SELF-SERVICE RESTAURANT, 104 W. 40TH STREET, NEW YORK CITY.

F. P. Platt & Bro., Architects.

ARCHITECTURE AND BUILDING. Plate 32.
Interior equipment—L. Barth & Son; electrical contractors—Wiltse & Griffen, Inc.; composition floors—New York Mineral Flooring Co., Inc.



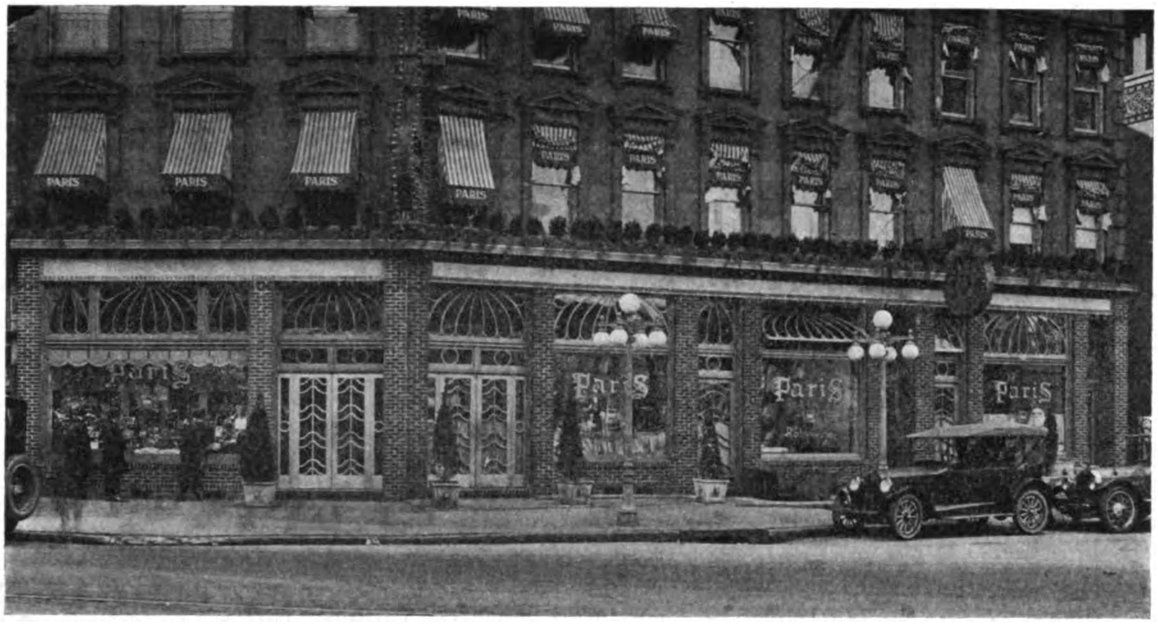


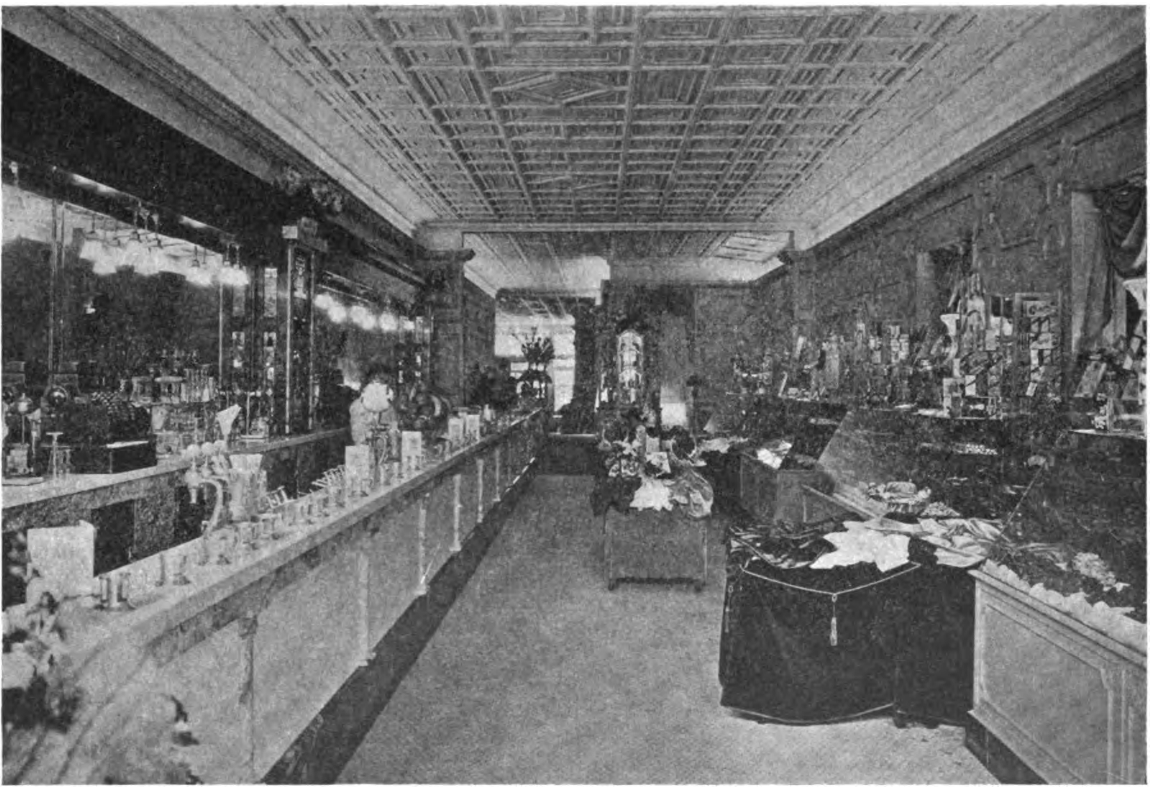
KNICKERBOCKER SELF-SERVICE RESTAURANT. PORTIONS OF THE KITCHEN AND DINING ROOM. 104 W. 40TH STREET, NEW YORK CITY.

F. P. Platt & Bro., Architects.

ARCHITECTURE AND BUILDING. Plate 33.

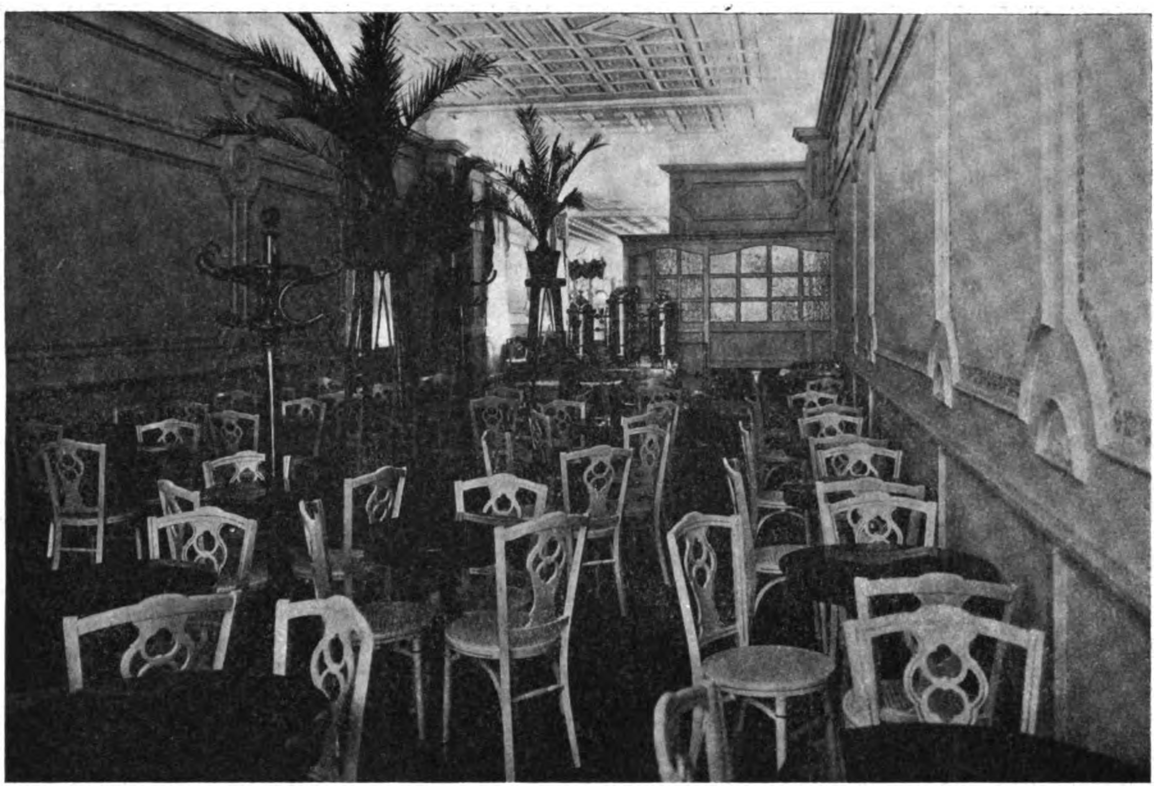
Interior equipment—L. Barth & Son; electrical contractors—Wiltse & Griffen, Inc.; composition floors—New York Mineral Flooring Co., Inc.; plumbing—Phillip Levitt, Inc.

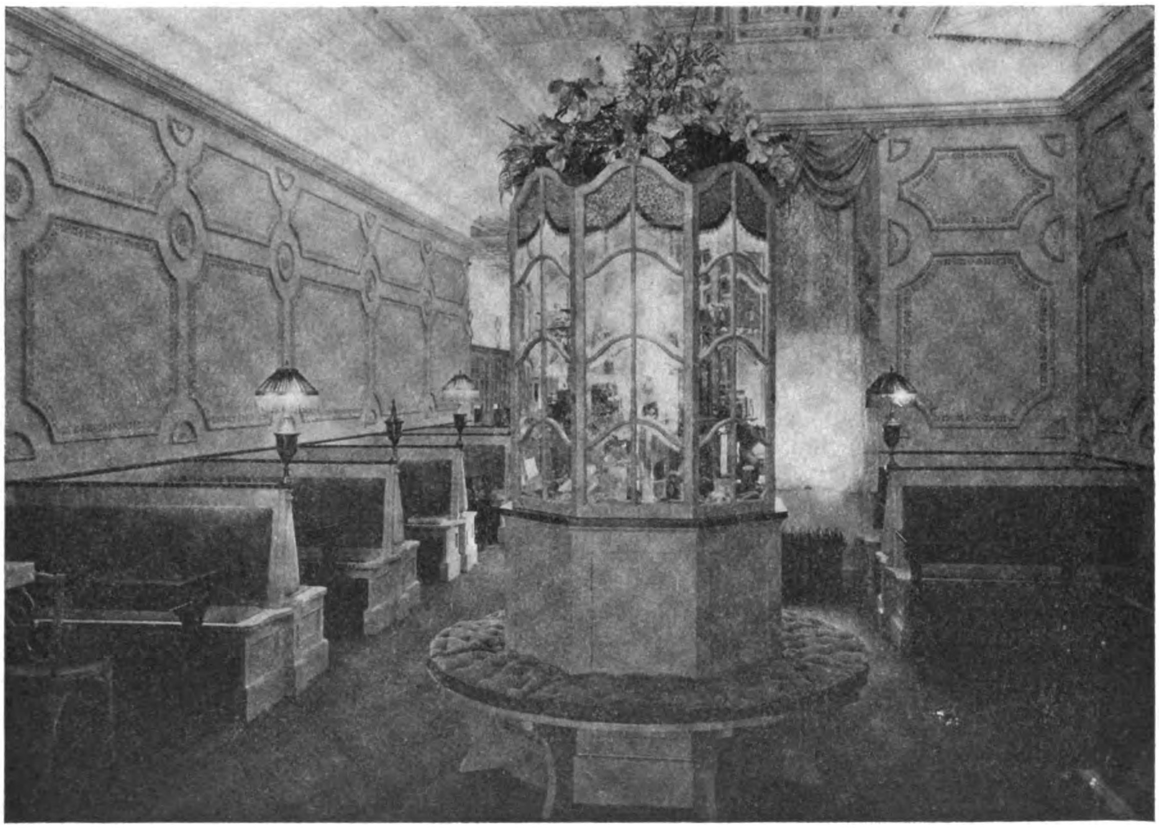




PARIS RESTAURANT, EXTERIOR AND THE SODA FOUNTAIN, FLATBUSH AVENUE, BROOKLYN, N. Y.

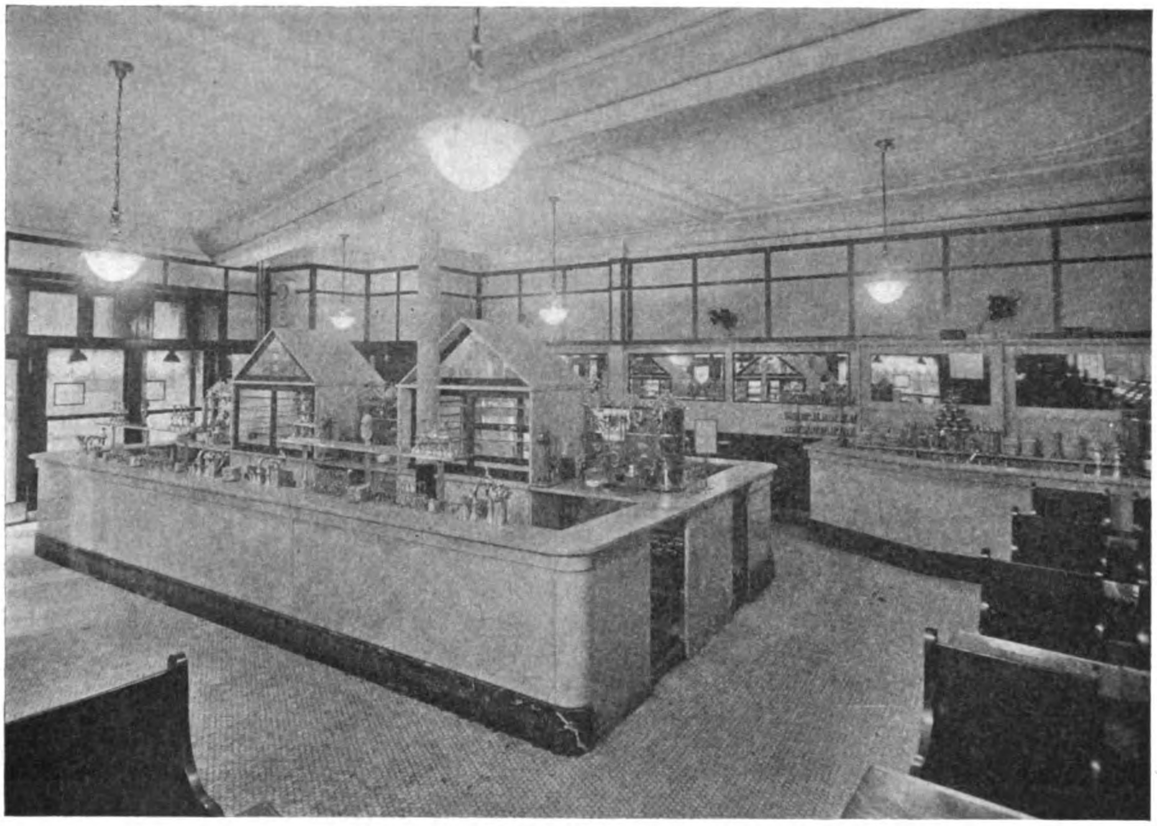
Architecture and Building. Plate 34.
Soda fountain equipment—Combination **Fountain Company; remodeling and**
alteration work—**Fraser & Scholes.**

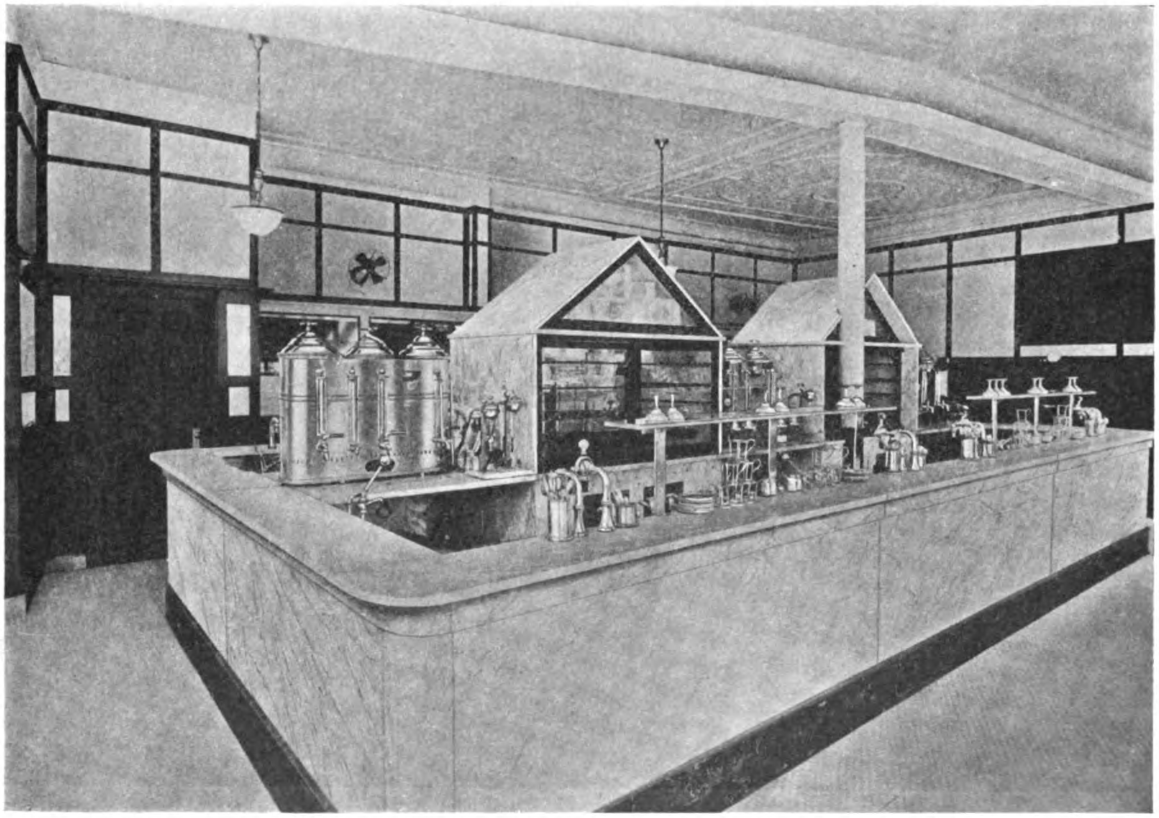




PARIS RESTAURANT, SODA FOUNTAIN LUNCH ROOM, FLATBUSH AVENUE, BROOKLYN, N. Y.

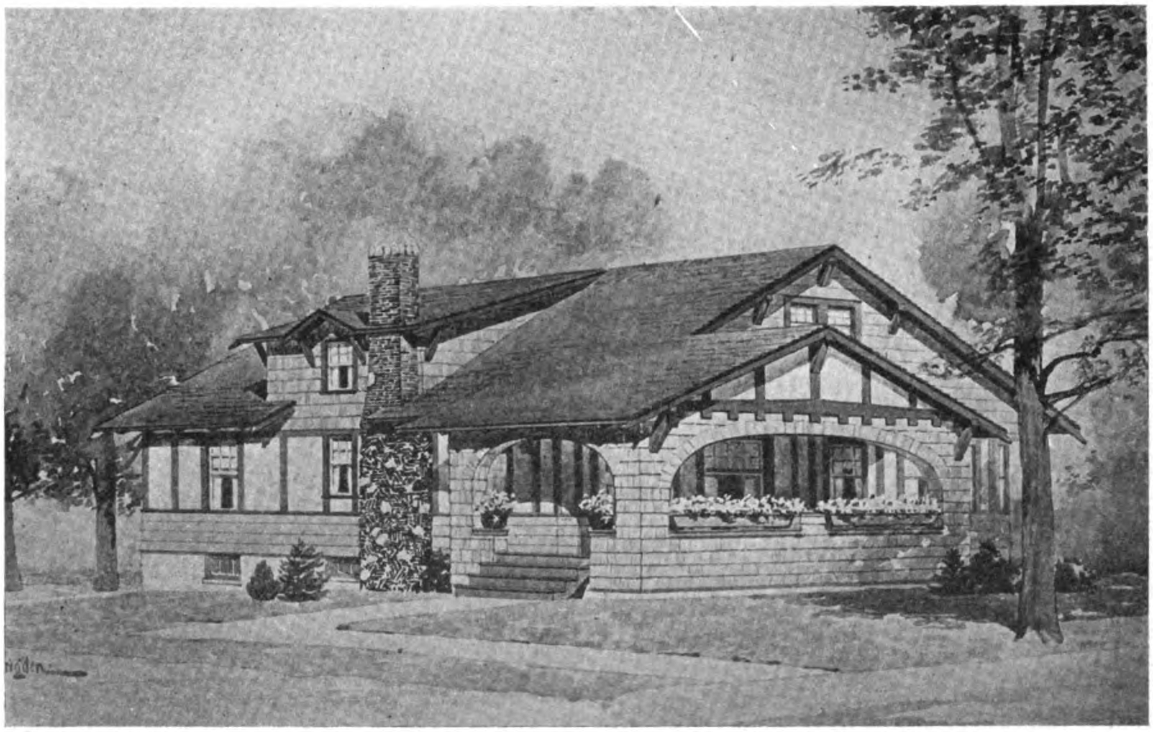
ARCHITECTURE AND BUILDING. Plate 35.
Soda fountain equipment—Combination Fountain Co.; decorations and furnishings—William Kleeman & Co.; tables and chairs—The Reischmann Co.; ice machinery—Cincinnati Refrigerating Co.; Frink reflectors used.

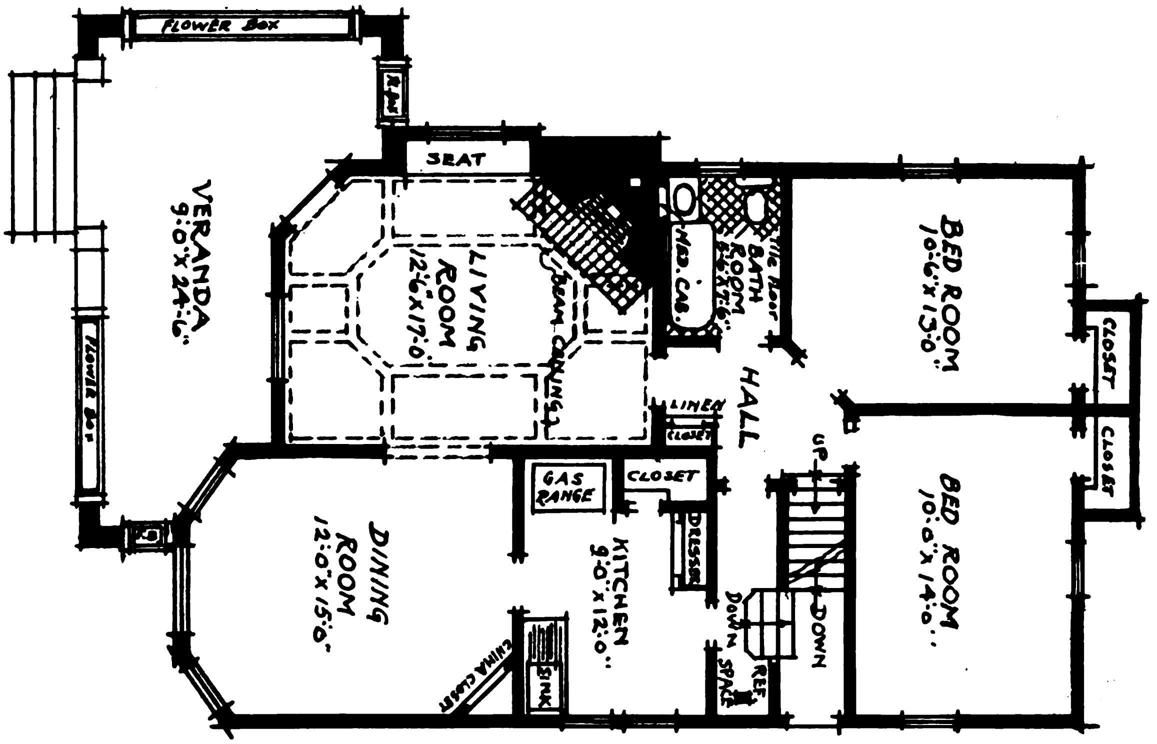




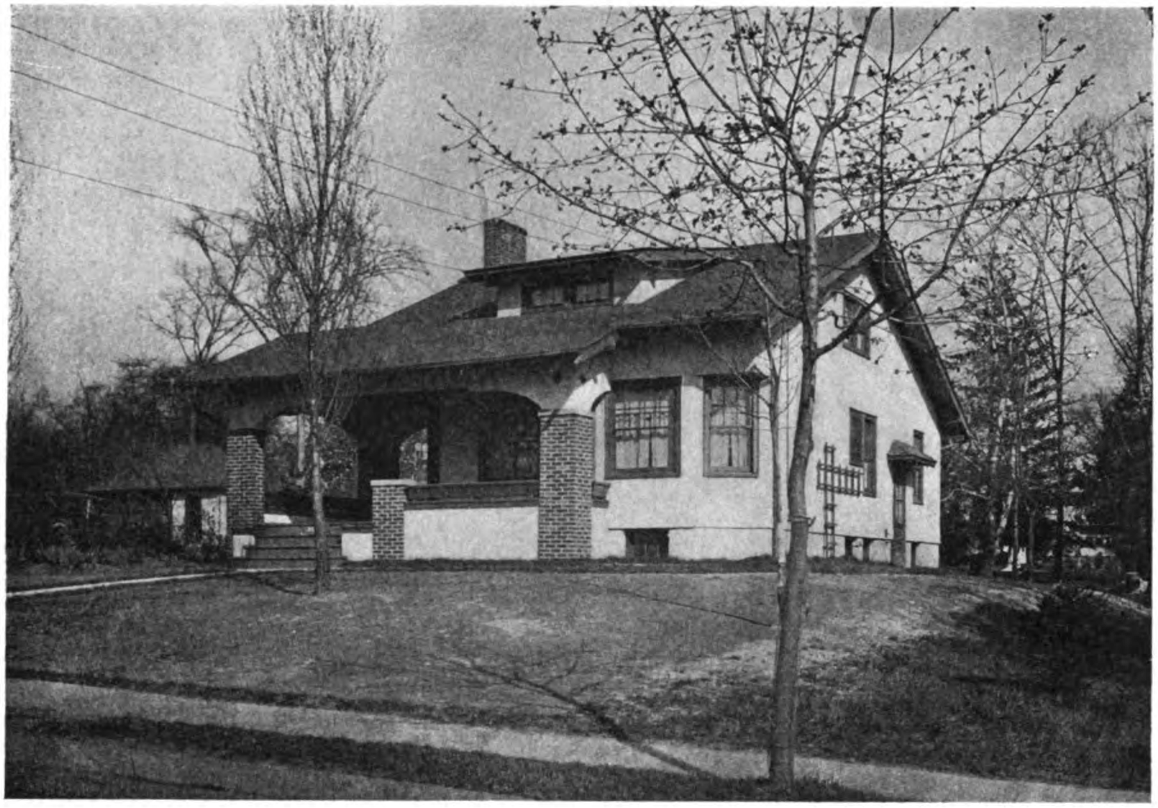
SODA FOUNTAIN SHOP AT 9 BEAVER STREET, NEW YORK CITY,
OPERATED BY THE GEM FOUNTAIN CORPORATION.

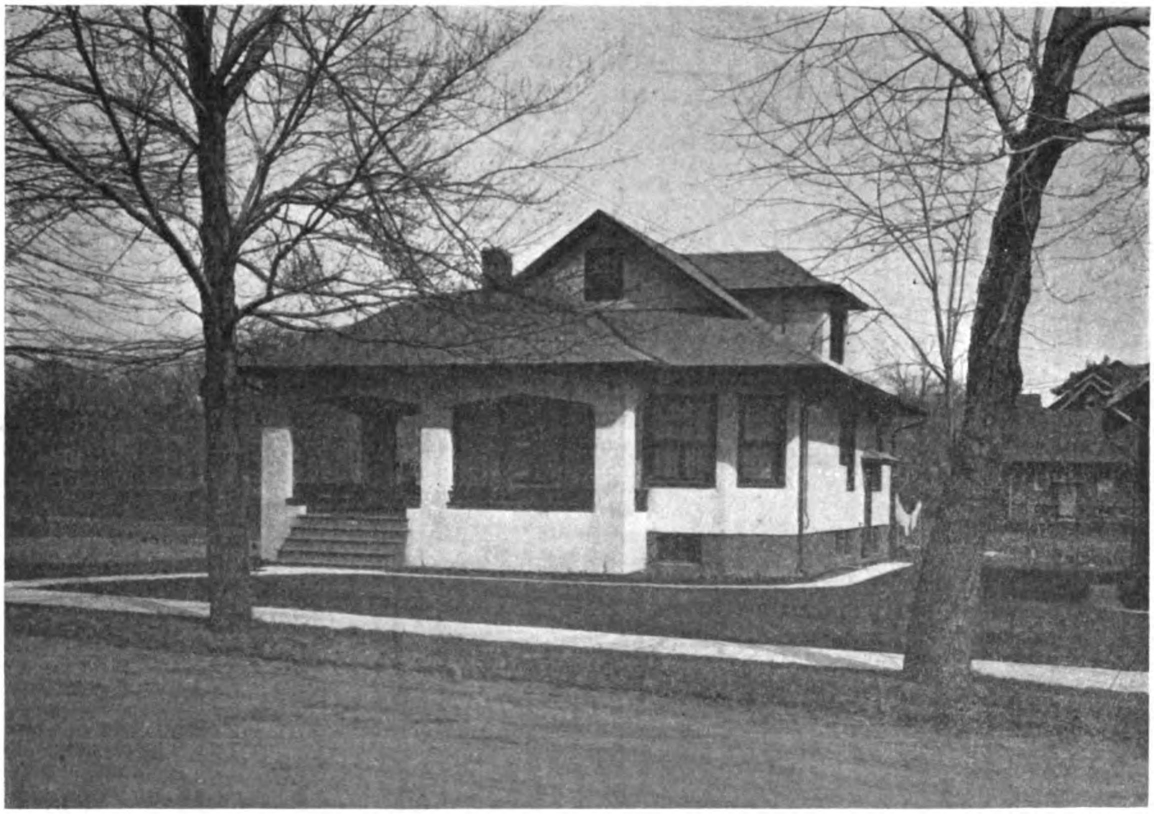
ARCHITECTURE AND BUILDING. Plate 36.
Fountain equipment—**Braunstein Bros. Soda Fountain Co.**





PERSPECTIVE OF HALF TIMBERED BUNGALOW AT NUTLEY, N. J.
William A. Lambert, Architect.





STUCCO BUNGALOWS AT NUTLEY, N. J. BUILT UPON THE SAME PLAN AS SHOWN ON PLATE 1.

William A. Lambert, Architect.

All of the buildings are of substantial fireproof construction being of steel and reinforced concrete with exterior walls of brick. All of the killing rooms are finished in white enamel and all the rooms where the food products are handled or stored are finished in enamel brick and impervious salt glazed tile. Metal or other nonabsorbent material is used wherever possible for tables and working areas and where cutting boards are necessary, provision is made for their frequent sterilizing.

The five story administration or service building has a ground area of 81x177 feet. The first floor contains a large reception room for visitors where there is a museum displaying the various products of Armour & Company. The employment bureau with commodious quarters also occupies this floor together with the offices of the purchasing department, superintendent, master mechanic, time keeper and pay master and other operating officers of the plant. There is also a locker room and assembly room for the Government inspectors. The second story contains locker rooms, toilet rooms and shower baths for men employes. The third story provides similar accommodations for women employes, together with an emergency hospital. A cafeteria for office employes occupies the fourth story and a private dining room is provided for the officers. In the fifth story are the general offices with telegraph and telephone room and an additional girls' rest room, and a barber shop. Skylights illuminate the central portion of the office floor and upon the roof there is space which serves as a smoking room with an enclosed promenade on one side.

Armour & Company maintain their own architectural and engineering department and the design of the plant was in the hands of R. C. Clark, as architect and Mr. Allen McKenzie as engineer.

Extensive provision is made for the comfort and welfare of all of the employes of the plant and in addition to the conveniences of lockers and wash rooms, there are two large cafeterias. One is located in the administration building and the other in the brine tank house, jointly furnishing service for over 1,000 persons at a time. The equipment of these rooms embodies the latest ideas in sanitation and economy of service. The tables and chairs are of substantial and simple construction so that they may be easily kept clean. The tables are made with metal bases and glass tops. All cafeteria counters are also built of metal with glass tops and no other material enters into their construction. There is a five inch space between the floor and the bottom of all of the restaurant equipment so that everything is free standing and the whole floor area may be flushed out and cleaned most readily.

All of the steam tables, pans and urns are made of extra heavy nickel silver and copper coils are provided for heating, while for the cold service heavy cork insulation is placed about all containers. The coffee urns are arranged to provide large capacity. There are four urns grouped together mounted on a nickel frame work with one large horizontally placed hot water tank above them connected with each urn. There are dish warmers also.

There is a kitchen for each cafeteria and in the administration building kitchen there are four sections of extra heavy ranges, two 60 gallon steam kettles, a four compartment steamer for vegetables, and puddings, all necessary equipment such as meat choppers, vegetable parers and other labor saving devices. All vegetable sinks and work tables are built of extra heavy iron with rounded sanitary corners. In the bakery, there is a double deck gas heated oven finished in white enamel and an additional ten gallon aluminum kettle for making desserts. There is a dough mixer of a barrel and a half capacity and machines for mixing cake, salad dressing, beating eggs, etc. In a separate room is a special dish washing equipment which is of the latest automatic type which practically eliminates the handling of dishes throughout the washing process. Albert Pick & Company provided the entire equipment for both cafeterias.

The brick of which approximately 8,000,000 were used in the general construction of all buildings, was supplied by the Western Brick Company. Where sanitary surfaces were required salt glazed title known as "Insul Glaz" was employed, the material being furnished by the Clay Products Co. Cement mortar was used for brick and tile work and for this purpose 20,000 barrels of Carney's cement was purchased from the Carney Cement Company. The mixture was one part cement to three parts sand without the use of lime. The quarry and ceramic floor tile was supplied by George H. Rees & Co. Bloxonend flooring is used for all heavy service floors, such as the trucking surfaces, as it combines all the advantages of a street pavement with those of a well finished interior flooring. The material was supplied by the Carter Bloxonend Flooring Co. In the garage it was necessary to have a large uninterrupted floor area and to secure this McKeown lattis trusses were used to carry the roof. This wood truss construction can be built at one-half the price of steel work and is assembled on the job, ready for erection by the time the walls are up. Spans up to 125 feet can be constructed by McKeown Bros. Co. The painting contract which is largely a matter of labor performed at the right time was carried out successfully by W. P. Nelson Co.

The extensive mechanical equipment of this great plant is filled with general interest in that, while most of it is especially designed for packing houses, many of the machines are applicable to other purposes and information concerning them is of value to designing engineers.

The Standard Scale and Supply Co. manufactured the scales used. The auto-call equipment is employed throughout the Armour plant and makes possible the location of department heads immediately wherever they may be at the moment in connection with their duties. The various systems devised by The Autocall Company are great time savers in any large organization but particularly so in a plant of wide extent such as this one. The night watch and fire alarm service is provided by the A. D. T. system of central station control. The equipment was put in by the American District Telegraph Co. The refrigeration equipment was installed by the Vilter Mfg. Co., the ammonia absorption machines being made by the Carbondale Machine Co. This plant produces 1,200 tons of refrigeration and there are three duplex machines, each consisting of two 20½"x40" horizontal double acting ammonia compressors, each direct connected to a 26"x45"x40" cross compound condensing Corliss engine. The pumps for a variety of uses, feed water heaters and other connecting equipment were furnished by Hodgart & Co. The ice handling machinery consisting of elevators and conveyors for the extensive iceing required for the packed products was supplied by the Gifford-Wood Co. An interesting piece of specialized mechanical equipment used in this plant but of a design suitable for other applications, are the Proctor automatic hog hair dryers with automatic feed equipment. This equipment is of large capacity though so designed as to occupy a small floor space. It was installed by Proctor & Schwartz, Inc. Machines called disintegrators are made use of to grind bone and tankage for the by-products of stock feed and fertilizers and are of a type manufactured by Stedman's Foundry & Machine Works. There are twenty-five passenger and freight elevators in the various buildings which include the large stock carrying elevators before referred to. This entire contract was held by Kimball Bros. Co.

THE SODA FOUNTAIN SHOP.—II.*

The type of soda fountain shop, which is planned to cater to the rush hour trade of the office districts, presents some vastly interesting problems which are psychological but intensely practical from the standpoint of revenue. No information has been heretofore available to direct the prospective investor in such an enterprise and he has chanced his judgment and own analysis of the conditions as he supposes or infers them to be. Even those who are now successful in the business admit the difficulty of judging a new location and freely admit that in starting an establishment in a new locality they gamble on the result and the fitness of the original equipment they install to most successfully meet the demands of the trade that may later develop. What does the customer want? That is the keynote to the situation and a most difficult query to prognosticate upon. One very successful manager admitted the fallability of his own judgment and said that he preferred to enter a neighborhood where there was competition as the existence of another successful shop proved the presence of trade in the locality and he had sufficient confidence in his own business methods to get sufficient trade in the same locality to make his investment pay.

The changes made in some of the shops to be described which tended to increase their patronage are interesting examples in point, and the reader after considering these remarks may draw his own conclusions as to why increased patronage resulted.

The shop at 9 Beaver Street, which is illustrated, is operated by the Gem Fountain Corporation and is of the medium priced service type. It is interesting as showing a very good example and also the large capacity that is obtained from a small floor area. The total area of the store is 800 square feet. In the center is the soda fountain occupying a floor area of 300 square feet. There is 74 feet of counter space, 12 feet on the ends and 25 feet on the sides. The distribution of the equipment is such that eight dispensers may work behind the counter, four on each side, and during the rush hours it is possible to serve 150 people continuously about this counter. In this place a large proportion of customers are men. In addition to the public fountain there is a service fountain in one corner, occupying a floor space of 5 by 10 feet. This is operated by one man and from it three waitresses obtain the services for seated customers. There are seats for 46 in all, located along one side and the back of the shop, and during the hours from 12 to 2 an average of about 375 people are served at the tables. There are two entrances, necessitating the placing of a cashier at each door, and in addition there is a candy counter adjoining one entrance which one girl serves. In regard to the trade the average purchase amounts to $.30. The average candy sale is about $.15 on week days and at the end of the week a specialty i made of box trade of medium priced candy. The equipment of the soda fountain is typical of the design employed by the Gem Fountain Corporation throughout their shops and the details of this are described elsewhere. The average receipts in this shop are $500.00 a day.

The two entrances to this shop are not altogether the great advantage that might naturally be expected. Two entrances are not necessary to admit the maximum trade the shop can accommodate at a given time, one entrance being entirely sufficient for that purpose. On the other hand, the two entrances mean two means of exit and it is therefore necessary to have two cashiers, one at each door. One cashier could easily handle the whole receipts, therefore the other one is entirely superfluous and together with the space occupied for her desk merely an addition to the operating expense which is bringing no return. Of course the answer uppermost in the reader's mind is—close one door. This, however, in the particular case does not seem advisable, but nevertheless the point is one well taken for consideration in planning a shop. The cashier is best placed near the door and every door necessitates a cashier. Superfluous salaries and unprofitable space build up overhead and reduce profits. Therefore have no superfluous doors.

Another shop operated by the Gem Fountain Corporation is at 33 Maiden Lane and meets the demand in a somewhat different type of locality. (This shop was illustrated in the February issue.) Maiden Lane is characterized as a restaurant street and when the shop was originally installed it was found that the soda fountain was not satisfactory. Alterations were accordingly made cutting 16 feet off the length of the soda fountain and using the addition space for seats and tables, as well as placing stool chairs about the fountain with the object of seating more people, the result being that the trade of the shop was increased.

In the shop at 80 Wall Street, operated by the same Corporation, (also illustrated in the February issue,) it was found that standing trade was more numerous, with the result that the counter space in the shop was increased and the number of seats reduced.

The shop at 138 Liberty Street has a featured tea room which was installed because of its advertising value. In summer the shop does a large soda water trade, but in winter time with the falling off of this trade and because the location of the shop requires customers to come a block or two for the most part for lunches, the tea room was installed as an attraction. It consists of an attractive little bungalow with an entrance within the shop, nicely appointed and arranged for cosiness and comfort. This has maintained the trade of the shop and gives it a good average throughout the year. The tea room also separates the two lines of customers and the standing trade is not confused with the seated trade.

The soda fountain is distinctly and purely an American institution. It was developed in America and is in every essential an American idea. However, it is now spreading and is finding favor and popularity in many countries. Its fame is predestined to be world wide.

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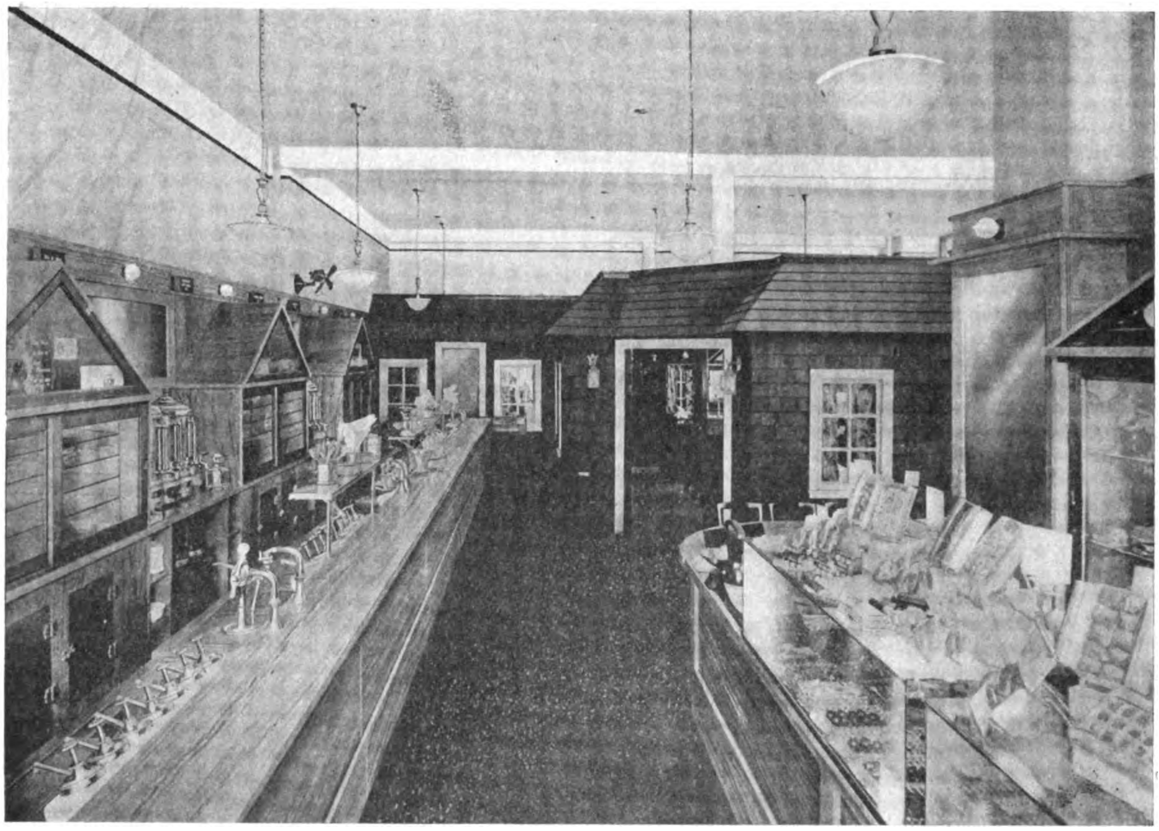


SODA FOUNTAIN SHOP AT 138 LIBERTY STREET, NEW YORK CITY, OPERATED BY THE GEM FOUNTAIN CORPORATION, SHOWING FOUNTAIN COUNTER AND TEA ROOM SEPARATED BY BEING ENCLOSED IN A BUNGALOW.

Fountain Equipment—Braunstein Brothers Soda Fountain Co.

Of its many applications, and digressing somewhat from the general text, we present in the plates of this issue illustrations of the Paris Restaurant soda fountain lunch room, in Brooklyn, known as the "Paris Patisserie."

This soda fountain shop adjoins but is not made a part of the Paris Restaurant. Its frontage joins the restaurant front being 20 feet on Flatbush Avenue. The store extends through to Atlantic Avenue, the back half being occupied by a tea room with a smaller space differently appointed for the service of ice cream and soda. The front half of the store has a long soda fountain along one side with candy counters facing it along the opposite wall. The tea room will seat comfortably one hundred persons. The planning of the interior is more a case of utilizing available space than that of a predetermined arrangement. Nevertheless it is successful and the seating space at the rear is particularly effective. The soda fountain is served by ten dispensers. There are four sets of draft arms each with two soda and one plain draft and 24 syrup pumps for each set. There are eight sinks and four ice cream cabinets.

The appointments of the interior are delicately decorative following French styles, and the effects are heightened by the artificial lighting. In addition to a moderate use of shaded fixtures, the general illumination is produced by cove lighting which is diffused by the interrupted surface of the ceiling. The floor of the shop is of mosaic, but the tea room and ice cream room are carpeted. The upholstery and carpetry is in a blue tone which combines well with the white furniture and interior finish. In connection with this shop a new kitchen has been built for the special preparation of candies and pastry. The refrigeration for this large soda fountain is of a mechanical type.

The soda fountain in this shop was installed by the Combination Fountain Company. The decorations and furnishings were executed by William Kleeman & Co., and the tables and chairs were supplied by The Reischmann Company. Frink reflectors are used and the ice machinery was manufactured by the Cincinnati Refrigerating Co. Fraser & Scholes did all the remodeling and alteration work. William P. Comstock.

(To be continued)

THE NEW METROPOLITAN ANNEX.

The Metropolitan Life Insurance Company has broken ground for the addition of another large building to further accommodate the New York offices.

When the Metropolitan Tower was built it was erected on the site of the old Madison Avenue Presbyterian Church and again the Life Insurance Company is replacing the church as the new annex is being erected upon the site of the church building that was built about fifteen years ago from the design of Stanford White of the firm of McKim, Mead & White. The church which is now being demolished was one of the architectural monuments of the city but with the shifting of the residence district, its congregation had so diminished that it had been amalgamated with that of the First Presbyterian Church at 12th street and Fifth Avenue. As an entity, the "Parkhurst" Church is no more but its beautiful architectural details have been salvaged and will go to adorn more than one structure, the facade of the Hartford "Times" building being one of the number.

Mr. D. Everett Waid, the architect of the latest Metropolitan annex has designed the building in conformity with the previous buildings and the new portion will adjoin the annex on 24th Street and will form one unit with it, 75 feet wide by 225 feet long and 16 stories high. Its exterior of Renaissance design will be carried out in South Dover marble and it will be connected at the twelfth floor by a bridge over the street to the Metropolitan Tower. At street level the new portion will contain an auditorium, seating 1,100, for conventions and gatherings of the employes. The entrances and exits will occupy the Madison Avenue front. The entrance to the upper stories will be on the 24th Street side, adjoining the old annex building, and six new 1 to 1 traction type electric elevators will give access to the upper stories of the joined buildings. The upper floors will provide large undivided office area and there will be toilet accommodations for both sexes in each story. In the twelfth story, there will be a cafeteria lunch room and at this level the street bridge will connect with the lunch room in the old building. The cafeteria will be supplied from the kitchen in the main building. The basement and sub-basement are planned for storage purposes. All power and service for the annex will be supplied from the plant of the main building connected through double tunnels under the street.

George A. Fuller Company have the contract for the erection of this new annex. W. G. Cornell Company have been awarded the contract for the plumbing and heating systems, Winslow Brothers Co., the contract for the steel frames and sash and the building and mason materials will be supplied by the Empire Brick and Supply Co. Joseph Elias & Co., Inc., have received the contract for the glass, and Grant overhead sash pulleys are to be used. The copper covered window frames and sash will be supplied by the Reliance Fireproof Door Co., and the sash weights by Sanborn Sectional Weight Co., Inc.

THE KNICKERBOCKER CAFETERIA.

The self-service restaurant came into its own during the war. Its popularity increased with rapid strides and not only were cafeterias started in many of the camps and in connection with manufacturing plants, both operated by the Government and by private interests, but numbers of such restaurants were opened as private enterprises and they met with immediate and great popularity. The Knickerbocker Cafeteria, which is illustrated in accompanying plates, is particularly noteworthy in that it represents ideas gained from examination and study of a great many similar institutions and in its planning and operation combines the best ideas which have been developed. Mr. Clarence B. Kugler, Jr., a man of national reputation as a restaurateur, is president of the Knickerbocker Self Service Company, the operating organization, and this cafeteria was designed by him with the assistance of the firm of Horwath & Horwath, public accountants, who specialize on food control for restaurants and lunch rooms in hotel, institutions, or in fact in any place where food is served.

The Knickerbocker Cafeteria has a U-shape plan with two street entrances. It has a gross floor area of 2,900 square feet, with 2,600 square feet available for seating. Its full equipment consists of fifty tables each with four chairs, seating a total of 200. It now serves an average of 1,500 people per day, but the equipment is sufficient to comfortably accommodate a patronage of 2,000. There are three rows of tables in one wing, two rows in the other and three rows of tables across the central portion at the rear with a service bar located along the sides and back.

The interior is very carefully studied from every point of view and the impression made upon the visitor is most favorable from first approach. Adjoining each entrance are large show windows in which are placed low food display cases, showing attractive portions entirely enclosed in glass. Above the cases there is a view into the restaurant giving an immediate impression of its pleasingly decorated interior. The color scheme is French grey, red and black. The floor is of Indian red composition, laid off in squares giving the effect of tiling. A high wainscoting reaching to a plate rail surrounds the room and this is in black. The table tops are also polished black glass, while the chairs and table bases are of dark finished mahogany. Above the plate rail the finish is in French grey with carbon black silhouette decoration in fresco, the themes being taken from the Colonial period of New York, reminiscent of the name of the restaurant. The interior illumination is excellent, being well diffused from centrally hung fixtures which carry a color note in a band of ruby glass. The service counter is very attractively appointed. It is built of red and black mosaic with all fittings of German silver and glass.

This counter extends along a portion of both sides and across the entire back of the interior and has a total length of about 90 feet. It is about 34 inches high and 30 inches wide and has a double slide rail for trays along the entire front. There is a three foot working space behind the counter for the counter personnel and a six foot aisle in front which is separated from the seating space by a substantial traffic rail. This wide space is allowed so that customers may pass each other while obtaining their food.

A comprehensive idea of the system upon which this cafeteria is operated is best obtained by lunching there, which we will describe for the benefit of the reader.

The management issues a menu entitled The "HOW" of The Cafeteria which describes the routine and gives the foods and prices. Using either entrance the patron proceeds at once to the right side of the service bar where a tray stand is placed attended during the rush hour by a waitress. Here a tray with napkin and silver is obtained, then passing on to the service counter, first sandwiches are at hand upon a series of glass shelves. Just beyond this is the cold bain marie which is 13 feet long and 25 inches wide and is constructed so that ice pans keep fruits and salads cool and palatable at all times. The lower portion contains compartments for reserve supplies of these dishes. Turning the corner of the counter is a steam table built of nickle silver, 19 feet long. Here are all the hot dishes which are served to the customer by the counter attendant, rapidly in accordance with the selection. Beyond this on a series of glass shelves are placed the desserts and at the end of this section is the milk pump and ice cream cabinet, also finished in nickle silver. The bread and butter is served at this point with the coffee urns at the end. Turning the corner of the counter is the checking desk where a clerk inventories the patron's purchases and gives a check which is presented for payment to the cashier just beyond and at the end of the service counter. The patron then having procured and paid for his food enters the restaurant to find a seat at one of the well appointed tables which are provided with condiments. Ice water is obtained from a cooler, four feet long, placed against one of the pillars.

The average length of time spent by each person is approximately twenty minutes, so that service during the rush hours is very rapid. The short time is possible because of the rapidity with which service is obtained, as it ordinarily takes a customer not more than three to five minutes to pass along the food counter to obtain his order. It is possible to serve 450 persons an hour.

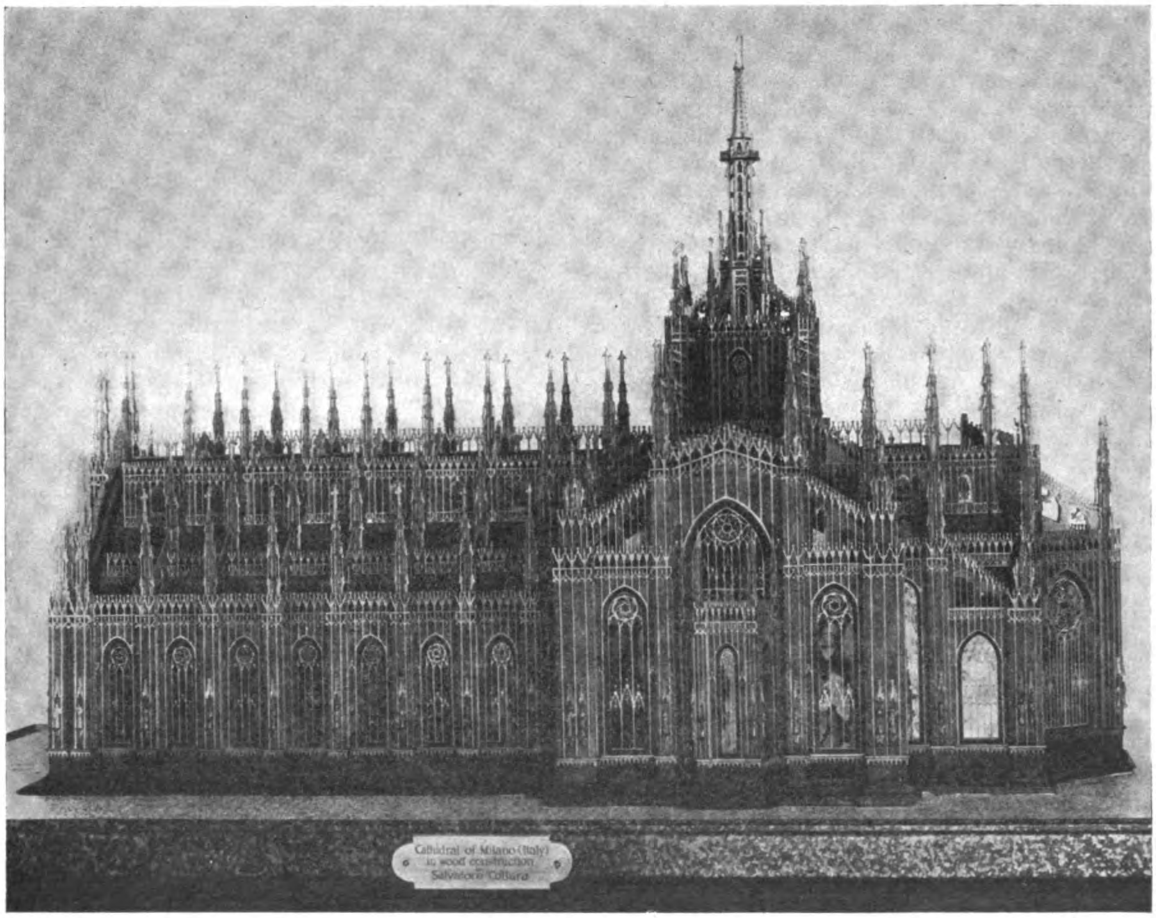
Buss boys working about the table space clear the tables and remove the trays and dishes which are carried to a dish conveyor which is designed to carry a single tray in each compartment. This is in continuous operation and carries the trays to the dish washing section in the basement.

Coat hangers and hat rails are placed along the walls near the top of the wainscot and through the central portion coat trees are also provided. There are well appointed toilet rooms for both sexes.

The kitchen occupies the basement and with its adjoining store rooms contains about 2.000 square feet of floor space. There is a bake shop where all the pastry is made on the premises and it is fully equipped with ovens, dough mixers and working tables. In addition to the ranges and extensive ice chests and store rooms, there are locker rooms for the convenience of the employes of both sexes. The kitchen has windows opening upon courts both at the front and the rear and ventilation is aided by artificial means. All garbage and refuse is disposed of by means of an incinerator. Including the manager, thirty-five employes operate the restaurant.

The dish washing section contains two sets of metal sinks with soiled dish and clean dish tables. The first set of sinks is used for silver and glass and the second for trays. The dishes are washed in a dish washing machine.

The system of cost analysis employed in this cafeteria possesses great practical advantage to any restaurant operator in that it gives a daily report and summary to date of the cost and gross revenue. The analysis shows the total food revenue, the cost of the supplies therefor, the gross profit thereon and the percentage of the gross profit thereon. This system is that devised by Horwath and Horwath and is now operated successfully in many large hotels and restaurants throughout the country, of which we might instance the Waldorf Astoria, the McAlpin, the Plaza,



MODEL IN WOOD OF MILAN CATHEDRAL MADE BY SALVATORE COLLURA.

Delmonico's and the Harvard and Knickerbocker Club, New York; the Bellevue-Stratford and Adelphia, Philadelphia; New Willard, Raleigh and Shoreham, Washington, D. C.; the Filene Restaurant in their Department Store in Boston; Jefferson Hotel, Richmond, Va. The system gives cost and gross sales analysis for each department in the kitchen, recapitulation and grand total of all and general percentages on the grand total to date, giving the percentage of gross profits on cost and sales with the cost of every dollar of sales as a unit figure. This is really the most important feature of any restaurant operation, as it gives a sure check from day to day as to profits and is a means through which waste can be instantly traced and checked.

The interior equipment of the cafeteria as well as the kitchen equipment was supplied by L. Barth & Son. Wiltse & Griffen, Inc., were the electrical contractors, and the plumbing for the restaurant, as well as for the entire building above, which is a bachelor apartment house, was done by Phillip Levitt, Inc. The composition floors in the restaurant were laid by the New York Mineral Flooring Company, Inc.

MODEL OF MILAN CATHEDRAL.

Architectural models are always interesting. They appeal not only to the architect but to the casually interested individual who will stop and marvel at their perfection.

The model of the Milan Cathedral constructed in wood by Salvatore Collura, an illustration of which is here presented, is of more than usual interest. The model is on a scale of approximately one foot to one hundred feet, being four feet long, two feet wide and three feet high. It is made with exact regard for detail and there are over 5,000 pieces in its construction which are nailed and glued together most solidly. The model separates into five pieces, the tower, the two ends and the two sides. Colored glass is used in the windows so that when the interior is electrically illuminated the effect is very pleasing.

The model was built from photographs and scale drawings and details prepared by the constructor who had made a thorough study of the building, being familiar with it from many visits.

Mr. Collura is a native of Messina and is a skilled cabinet maker but his work upon this model proves him also to be an artist. He built it in his spare time, working on it for over eight years. The model at present is on exhibition at the Studio of Paul Chalfin, 207 E. 49th Street, but it would seem that such an interesting artifice would be very appropriately placed in some permanent museum as it well deserves a place of honor in any collection of architectural models. Mr. Collura is represented by Mr. P. Borgia of 1947 Broadway, New York City.

A pamphlet entitled "Denmark: Agriculture, Commerce, Finance," has been issued by Brown Brothers & Company, of 59 Wall Street, New York City. This is a very interestingly prepared resumé of the resources of Denmark, attractively illustrated and worthy of a place in any library file. Copies may be obtained gratuitously.

Book Reviews

COLOR SCHEMES FOR THE HOME AND MODEL INTERIORS. By Henry W. Frohne and Alice F. and Bettina Jackson. Philadelphia, J. B. Lippincott Company. Twenty full page color plates showing actual color schemes for rooms, twenty full page suggestive instructions for the use of these schemes and twenty full page illustrations of fully furnished rooms, specially designed as a guide to furnishing. Quarto, Price, $4.50 net.

This book is written for the benefit of the home maker as stated in the authors' preface and is an ABC of good taste in decoration. The striking feature of its preparation is the profuse use of colored plates which give the color scheme of the interiors presented. One plate shows an interior view in black and white and upon the opposite page, the color scheme of decorations is presented in a colored plate, giving the floor covering, wall covering and hangings by a color reproduction made directly from small samples of the materials used. A pae of text accompanies each group of plates, explaining concisely the scheme of decoration and the general furnishings. The first part of the work is on color and form in furnishing hte home and is a general description setting forth principles. The second part, entitled "Color Schemes—Model Interiors" is the series o fexamples previously referred to. The book really is a graphic presentation of the subject of decoration and should be as useful as it is attractive. To the architect the book should be very valuable to show to a client as selections may be made from it very readily and confusion of ideas and long explanations avoided.

THE FOUNDATIONS OF CLASSIC ARCHITECTURE. By Herbert Langford Warren. New York: The MacMillan Company. 9½ x 6½ inches, 357 Pages with numerous illustrations, Cloth, Price, $6.00.

This work will be dear to the hearts of all those who knew Professor Warren and it is a contribution to architectural literature which will perpetuate his memory. It was a cherished project of his later years and is a memorial of his long years of study and analysis. The work is a study in architectural evolution and an analysis of the development of ancient peoplse who have written their history in the architectural monuments which are left for our enlightenment today.

The successful architect must thoroughly know his subject to design capably. His knowledge of the theory of construction must be coupled with the history of design. In the introduction written by Mr. Fiske Kimball there is a quotation from one of Professor Warren's lectures: "Our choice lies simply between really knowing it and using it wisely in the fullness of knowledge, or knowing it only superficially and misusing and misapplying it ignorantly....We must seek to combine scholarship with artistic impulse and enthusiasm, must seek to give that impulse and enthusiasm the sure basis of knowledge." Such is the aim of this work, not different from many other texts on the history of Architecture, but valuable in that it expresses the personal views of Professor Warren.

(Continued on page 20—Adv.)

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BOOK REVIEWS.

(Continued from page 40—text)

The introduction gives a short biography of the author as recorded by the Faculty of Architecture at Harvard where he was Professor of Architecture. It further refers to many of his activities both in and out of the field of architecture and to his other contributions to architectural literature. There are five chapters on Egypt, Masopotamia, Persia, the Aegean and Greece, with 120 well chosen illustrations which are described in the text. The drawings specially prepared for the heads of the chapters by Mr. Harold Broadfield Warren were contributed in memory of his brother.

ESTIMATING CONCRETE BUILDINGS; By Clayton W. Mayers. Boston, Mass., Published by Aberthaw Construction Company. Price $1.00.

This small but valuable text book graphically shows an actual estimate on a small concrete building and describes in detail the process by which the estimate is prepared. As estimating the cost of concrete buildings is a process that is unfamiliar to many architects and contractors, the system expounded in this book is of great interest. Estimating concrete buildings is subject to great variation dependent upon local conditions of labor and cost of materials but the application of the principles of taking off quantities and costs, as here given are general and should enable anyone familiar with estimating processes to make a reasonably accurate calculation of costs preliminary to construction. The most instructive portion of the volume is Part II relating to the determination of unit prices. The figures as prepared are based upon data available at the date of August 1919 in New England. Allowances should be made for differences in prices prevailing in the locality where a building is to be erected. While a price of $1.00 is set upon this book, the publishers announce that they will furnish free copies to architects and engineers, and also to technical schools upon request.

THE PRACTICAL BOOK OF INTERIOR DECORATION. By Harold Donaldson Eberlein, Abbot McClure and Edward Stratton Hollaway. Philadelphia: J. B. Lippincott Company. 460 Pages of Text, 300 Illustrations of Interiors and Furniture, including 7 plates in color, Handsomely Bound and Boxed. Price, $7.50 net, Postage Extra.

A writer on interior decoration has such a wonderfully diversified field that a new book on the subject always possesses interest and the reader is sure of new revelations at least of view points. The book now under consideration, from the joint authorship of three individuals all of high reputation in the decorative fiedl, brings to the reader a combined experience of more than usually weight. There is a great wealth of material in the book. The illustrations are extensive, extremely well chosen and beautifully presented with great clearness as to detail.

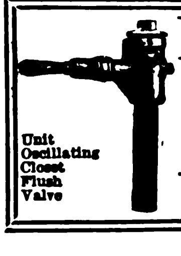
In the authors' foreword, the reasons for writing the book are given, together with some excellent advice. Quoting from the Preface: "Our twofold purpose is, in the first place, to stimulate intelligent co-operation with the decorator, to encourage appreciation of what the decorator does and to afford a sound basis of discriminating criticism and judgment; in the second place, to aid the householder who may elect to achieve either a limited decorative improvement or the execution of an whole constructive scheme. It is also felt that the decorator and the dealer will find in this volume much information compactly arranged for instant reference."

The text is presented in three parts. The first deals with Historic Decoration in Italy, Spain and France, interior decoration in England prior to the 18th Century and in England and America during the 18th Century which receives extended consideration. The decorative periods in other countries are treated in the same way, divided into two parts, one prior and the other during the 18th Century. The 19th Century and after are also discussed.

The second part is upon practical decoration and furnishing, and takes up the abstract portions of an interior in the different chapters.

The third part considers international and interperiod decoration and furnishing and is a discussion of styles.

(Continued on page 22)



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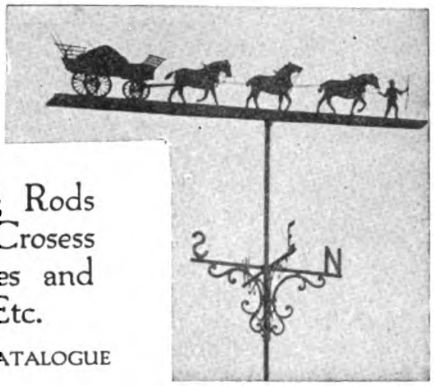

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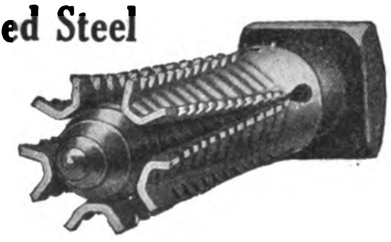

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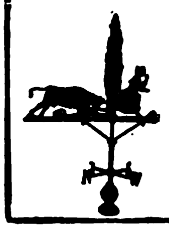

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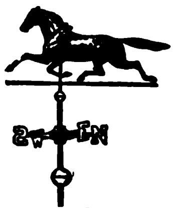

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One point that impresses the reviewer in examining the book is the careful co-ordination between the text and plates. In all there are 173 plates, some of which present more than one figure. Each plate is carefully analyzed in the text so that the reader may get the full weight of the authors' criticism, favorable or adverse as the condition may be. The plates are gathered from a great variety of sources and throughout the authors have been at pains to accredit them to the original sources.

HENDRICKS' COMMERCIAL REGISTER OF THE UNITED STATES FOR BUYERS AND SELLERS, 28TH ANNUAL EDITION, 1919-1920.
S. E. Hendricks Co., Inc., New York, $12.50.

The latest edition of "Hendricks' Commercial Register" has just been published, after being delayed for two months by the strike of the printers in New York. The new edition contains several improvements. The most noticeable being the new method of exterior indexing by coloring the front edge red, white and blue to indicate the different main sections of the book.

First is blue on which is stamped the words "Trades Index." This is a section of 162 pages in which every product listed in the book is indexed and cross indexed for ready reference. The red section is the main classified trades list. It contains 1,813 pages listing over 18,000 different products. In the present edition we find over 1,200 new headings including many headings completely covering the chemical industry. The third section of the book as indicated by the white edges contains 216 pages listing the trade names under which products are manufactured, with the name and address of the manufacturer. The second blue section is the Alphabetical section of 487 pages containing all the names in the book in one alphabetical list with addresses, and their main line of business. This is followed by the index to advertisers of 20 pages, containing a full list of branch and foreign offices following each name. The whole book making a volume of 2,703 pages.

It is an excellent work, a copy of which should be in every sales and purchasing department. For the former it contains complete lists of all prospective customers and for the latter it shows at a glance the producers of any product which may be required. The list of trade headings covers from the raw material to the finished article all products connected with the electrical, engineering, hardware, iron, mechanical, mill, mining, quarrying, chemical, railroad, steel, architectural, contracting and kindred industries, and the firms listed cover producers, manufacturers, dealers and consumers.

"Hendricks' Commercial Register" has been published annually by the S. E. Hendricks Co., Inc., exclusively for 28 years. The publication of this important reference book involving a tremendous amount of detail work in compilation and annual revision places before purchasing agents and sales managers a fund of valuable information not elsewhere available.

EXERCISES IN LETTERING, ARCHITECTURE AND OTHER ALPHABETS. By George G. Greene. Milwaukee: The Bruce Publishing Company. Price, 15c.

This small pamphlet, vest pocket size, shows a number of useful alphabets Roman capitals, old English, vertical Gothic, poster style, etc. It is issued for school use where lettering is taught in courses in mechanical and architectural drawing.

April

V

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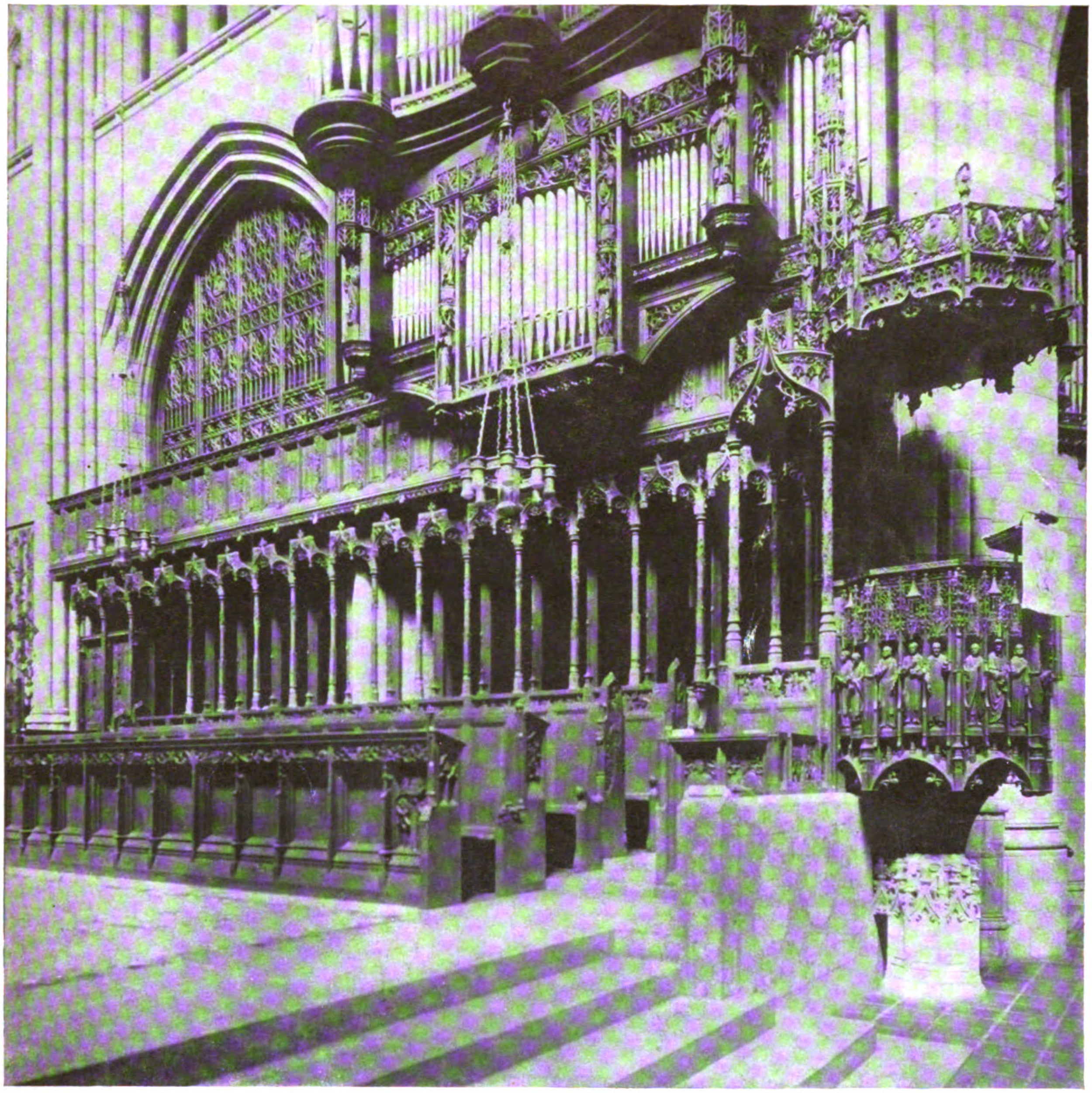

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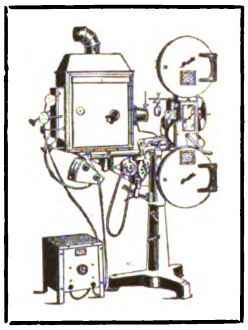

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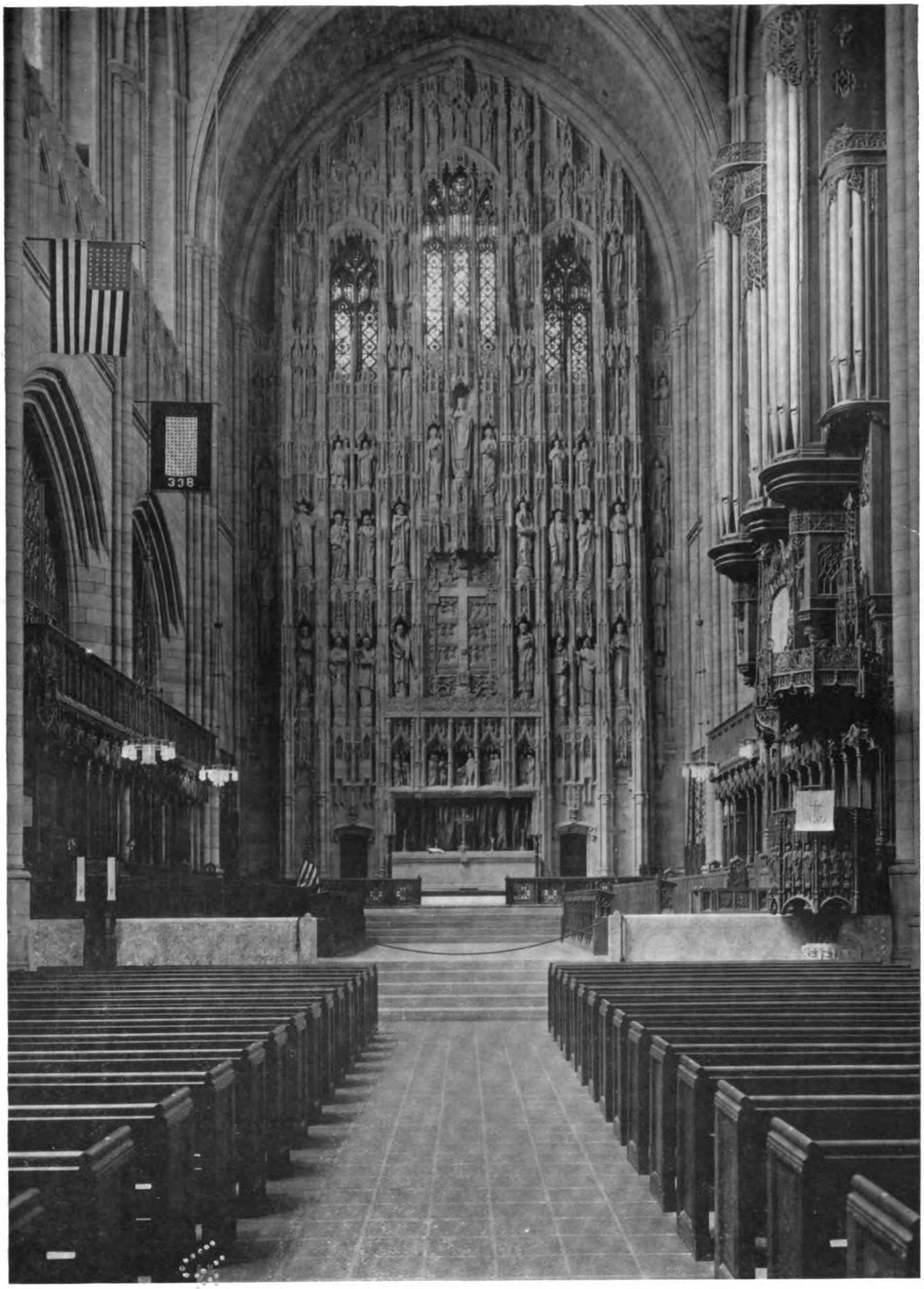


REREDOS OF ST. THOMAS CHURCH, FIFTH AVENUE AND 53D STREET, NEW YORK.

Bertram G. Goodhue, Architect.
Lee O. Lawrie, Sculptor.

Erected of Dunville Stone, quarried at Dunville, Wis., furnished by Tompkins-Kiel Marble Company; erecting and carving by Ardolino Bros.

ARCHITECTURE AND BUILDING

A Magazine Devoted to Contemporary Architectural Construction

WILLIAM P. COMSTOCK
Managing Editor

Volume LII APRIL, 1920 **Number 4**

THE DURANT BUILDING.

Now under construction in Detroit Mich., for the General Motors Corporation, the Durant Building promises to be, when completed, one of the largest as well as one of the best appointed office buildings in the United States. It is safe to say that this building is the largest structure ever projected for single occupancy for executive purposes by any private organization in the country. Even compared to it, there are few government buildings with like floor area and capacity. It is quite in accord with the splendid business growth of Detroit and its rapid increase in population and importance that such a structure should be erected there. The building is a monument in a way to the great development of the automobile industry as a whole but more particularly of course to the wonderful industry built up by the General Motors Corporation. In a decade this organization has developed from a comparatively small company to one of the largest corporations in the world.

The Durant Building Corporation was formed to handle the construction of the Durant Building for which Albert Kahn prepared the designs. The Thompson-Starrett Company have the building contract.

The building will have a frontage of 504 feet on Grand Boulevard and a depth of 244 feet. Immediately behind it there is a court 18 feet in width which separates it from the laboratory building which fills out the square between Grand Boulevard and Milwaukee Avenue. The laboratory building, planned to provide space for the reasearch and experimental development of the General Motors Corporation is 60 feet in depth and faces Milwaukee Avenue with a frontage of 504 feet, the same as the main building.

The office building is fifteen stories high and is designed with three open courts above the first story which divide the building into four bays. The first story is to be entirely used for automobile show rooms except for the space allotted in the rear center to the auditorium which will have a seating capacity for 1,600 people. The stories from the second to the thirteenth inclusive are to be occupied by the general offices of the General Motors Corporation, while the fourteenth story provides space for the executive offices, some private suites and dining rooms for the executives. The fifteenth story will contain a large dining room operated with cafeteria service for the use of the clerical forces in the building. Here there will also be rest rooms and hospital equipment, with offices for an attendant physician and dentist. A dance hall is also included in the plans for the use of the employes. Kitchen, valet and servants' quarters are provided for in a partial sixteenth story.

The laboratory building is a five story structure equipped to meet every mechanical requirement for physical, chemical and engineering research work. The total cubical contents of the two buildings is 20,412,000 cubic feet and the gross floor area is 1,321,600 square feet. About one block away located on a railroad siding is a power house designed to produce 2,000 h. p. A power tunnel 10 feet wide and 8 feet high connects it to the two buildings.

A feature which will make the Durant Building noteworthy for long to come is the design of the exterior to be carried out entirely in Indiana limestone. This material will be used on all facades from grade to skyline. The height of the facades is 203 feet and following the cornice line the perimeter is 2,648 feet. Approximately 476,000 cubic feet of limestone will be required and this will make about 1,200 carloads which it was figured could be delivered in 120 working days. The handling of this large amount of stone at the building site required careful study and the storage yard was equipped with three stiff leg derricks to unload, distribute and stack the stone. The stone is so stored that when setting operations begin it can be taken from the stacking yard in the sequence required at the building without extensive rehandling.

On Milwaukee Avenue, the entrance of the laboratory building will be emphasized by a portico containing six fluted Ionic columns, five feet in diameter and made up of three drums with a total height of 40 feet.

The fourteenth and fifteenth stories of the main building are treated with another beautiful colonnade consisting of two hundred and ninety-two engaged monolithic columns two feet four inches in diameter and twenty-one feet seven inches high inclusive of bases and capitals in Corinthian style. In the ten story shaft of the main building there will be 7,442 pier stones two feet six inches wide one foot two inches thick and four feet high. The corner piers will be built up of 520 stones five feet seven inches wide, one foot thick and four feet high. In the shaft there are 2,928 windows with limestone sills, lintels and spandrels.

The production of this great quantity of stone shows the resources of the Indiana limestone industry and the ability to produce it is a tribute to the high development of this industry.

The cut stone contractors for this building are the Central Oolitic Stone Company, and all the interior marble will be supplied by Tompkins-Kiel Marble Co. The cement will be supplied by Winkworth Fuel & Supply Co., and A. M. Byers Company have the contract for the pipe to be used. The interior woodwork will be supplied by Alfred Struck Company, sash pulleys by Coleman Hardware Company and the door closers by the Norton Door Check Company. The Sanborn Sectional Weight Co., Inc., have the contract for the sash weights, Monarch Metal Products Co.'s weatherstrips will be used and the asbestos pipe covering will be supplied by the Columbia Asbestos Pipe Mfg. Co., Inc. The Bishop & Babcock Company have the contract for the vacu-traps and temperature control system, and the elevator gates will be supplied by the Quincy Elevator Gate Co. The sheet metal work, ornamental copper stamped work, roofing and peerless skylights will be executed by The Howie Company, Inc. The A. D. T. system of Central Station Night Watch and Fire Alarm Service will be installed by the American District Telegraph Company, and the American Bridge Company are doing the structural steel work.

ST. THOMAS' CHURCH.

The new reredos and additional wood carvings recently completed in St. Thomas' Church, Fifth Avenue and Fifty-third Street, New York, deserve an ample description and we quote a recent article in "The Churchman" as being the most adequate.

"The reredos is one of the largest in the world, and the most elaborate thing of its kind in America. It contains upwards of seventy figures and covers, indeed forms part of, the entire sanctuary end of the church. The stone, while not from the same quarry, matches that of the rest of the interior of the church. The woodwork, quite as elaborate in its way as the reredos, comprises not only the choir stalls but sedilia, bishop's chair, pulpit, etc., also an elaborately inlaid choir parapet of stone and marble.

"The panel directly over the altar, under a deeply recessed canopy, portrays the exact moment at which St. Thomas recognizes the Risen Christ. Over the canopy is a frieze of the Messianic prophets and back of the frieze rises the glorified cross from a vine through which sheep are grazing. The cross is roughhewn. At its base appears the chalice, and at its head the crown of thorns surmounted by a diadem. At the end of either arm appear the symbols of the four evangelists. Angels in adoration are carved at the sides of the cross, and above is the inscription 'Thou are the King of Glory, O Christ.' The shields in the panels on either side of the cross carry the implements of the Passion. Over the cross in a glorified Calvary appears the Christ as Prophet, Priest and King, with the Virgin Mother and the Beloved Disciple bearing the chalice.

"The series of panels at the very top of the reredos constitute a crown of martyrs. In the centre are three angels, each carrying a babe, the Holy Innocents. At the left as one faces the reredos appears St. Stephen; at the right, Philip the deacon. Over the centre of the left hand window (the observer's left, that is) appears St. Ignatius flanked by Savanarola and St. Gregory the Great. Over the centre of the right hand window appears St. Francis of Assisi with his dog, and at his left and right, Polycarp and St. Cyprian. The four figures in the line of the windows are early Fathers of the Church; from left to right St. John Chrysostom and St. Athanasius representing the Greek Fathers, and St. Jerome and St. Augustine representing the Latins.

"The eight small figures in groups of two in the next row are English Church figures up to the time of the Reformation. They are, left to right, Restitutus, Bishop of London who attended the council at Arles, St. Columba, St. Augustine, Theodore, the Venerable Bede, Wycliffe, Cranmer and Laud. The four small statues immediately under them represent the missionary advance of the Church, Bishop Selwyn, Bishop Patteson, Bishop Payne and Bishop Williams of Japan. The line of figures under the missionary figures shows the Apostles, and left to right portrays St. Bartholomew, St. Philip, St. James the Less, St. James the Greater, St. Andrew with his loaves and fishes, St. Simon, St. Jude and St. Matthias.

"The most striking figures are those large ones directly over the altar which show, from left to right, St. John the Baptist, the forerunner; the two evangelists, St. Matthew and St. Mark; St. Paul, the apostle to the Gentiles, preaching on Mars Hills; St. Peter the apostle to the Circumcision (a statue modeled after the Antioch chalice figure); St. Luke and St. John; and finally the patron of the parish, St. Thomas. The extreme left hand column of figures, recessed a little behind the main portion of the reredos, represents the English Church, from bottom to top showing Gladstone, Canon Liddon, John Wesley, and Bishops Hooker and Butler with a relief of the expulsion from the Garden of Eden at the very top. The corresponding panel on the right hand shows the American Church, Bishop Tuttle, Bishop Brooks, Washington, Bishops Seabury and White and a relief of the Annunciation at the top.

"Over the little doors to the left and right of the altar, doors carved in wood by stone cutters and trimmed with carved iron, show on the left gargoyles of the Red Cross nurse, the Buddie and the Gob and on the right the musicians, the violinist, the pipe organ player and the chorister. Birds and beasts, allegorical and grotesque, ornament the panels and add to the richness of the whole.

"The altar itself is almost austere in its simplicity. The only carving is the cross with the Greek words, 'Jesus Christ Conquers.'

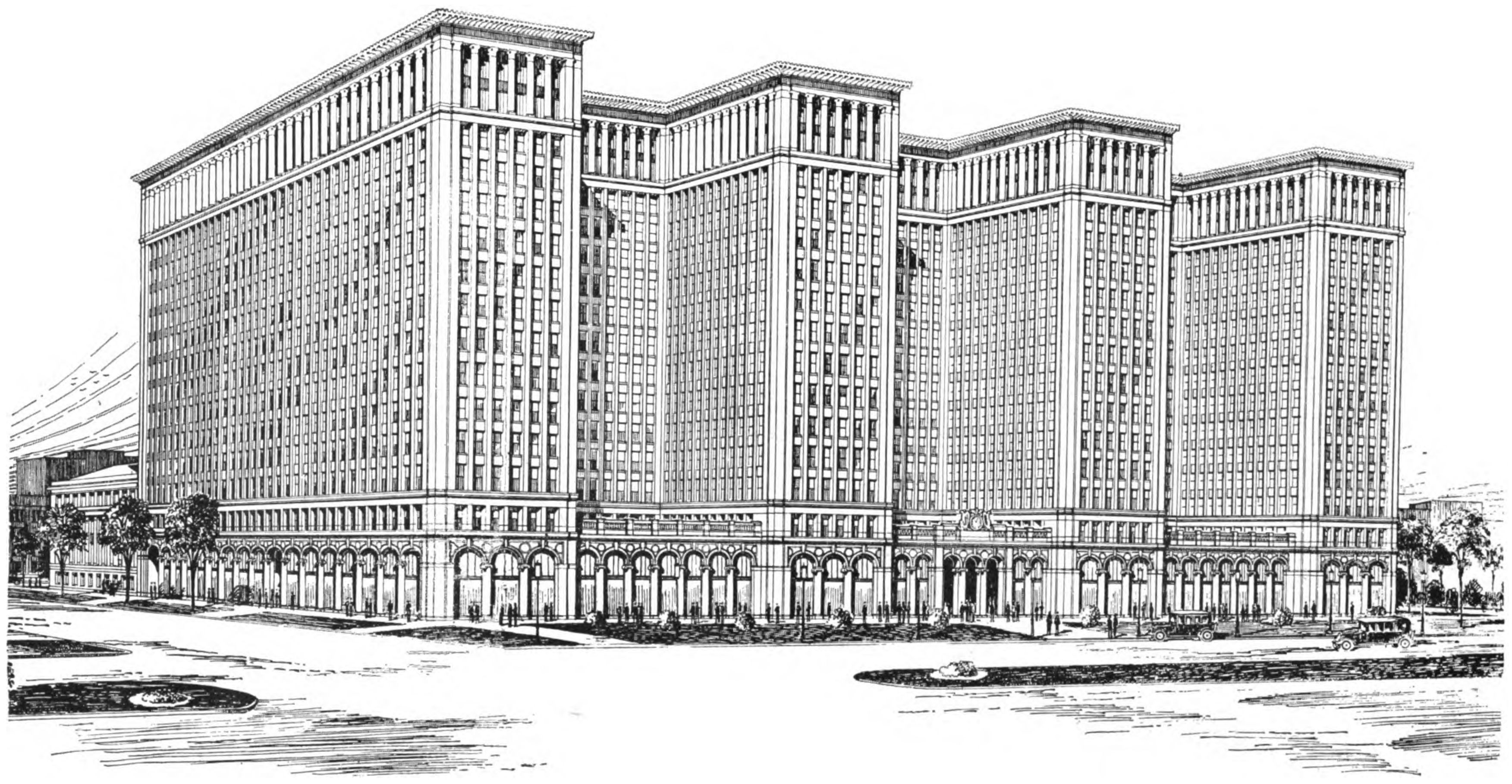
"The architect for the whole is Bertram G. Goodhue, and the sculptor of the reredos, Lee O. Lawrie. The reredos is erected of Dunville stone furnished by Tompkins-Kiel Marble Co., and the stone carving was carried out by Ardolino Bros., the parapet by George Brown Co., and the woodwork by Messrs. Irving & Casson-A. H. Davenport Co. of Boston and New York."

COLORED WOMEN'S BRANCH, Y. W. C. A.

The Young Women's Christian Association has recently opened a new building for the use of colored women at 179 West 137th Street, New York City. This building is designed to meet the needs of about 1,200 members and furnish every advantage offered by other branch buildings in the city.

The problem of the colored girl in New York has been a serious one. She has had comparatively few facilities for wholesome recreation, no swimming pool in the city was open to her, and practically no safe, investigated rooms in which to live were assured to her. This building meets this need in the locality, and to help solve the housing problem of these girls, an association residence has just been opened at 200 West 137th Street. Here will be established a comfortable boarding home, safe and reasonably priced, for the colored girl living alone in New York.

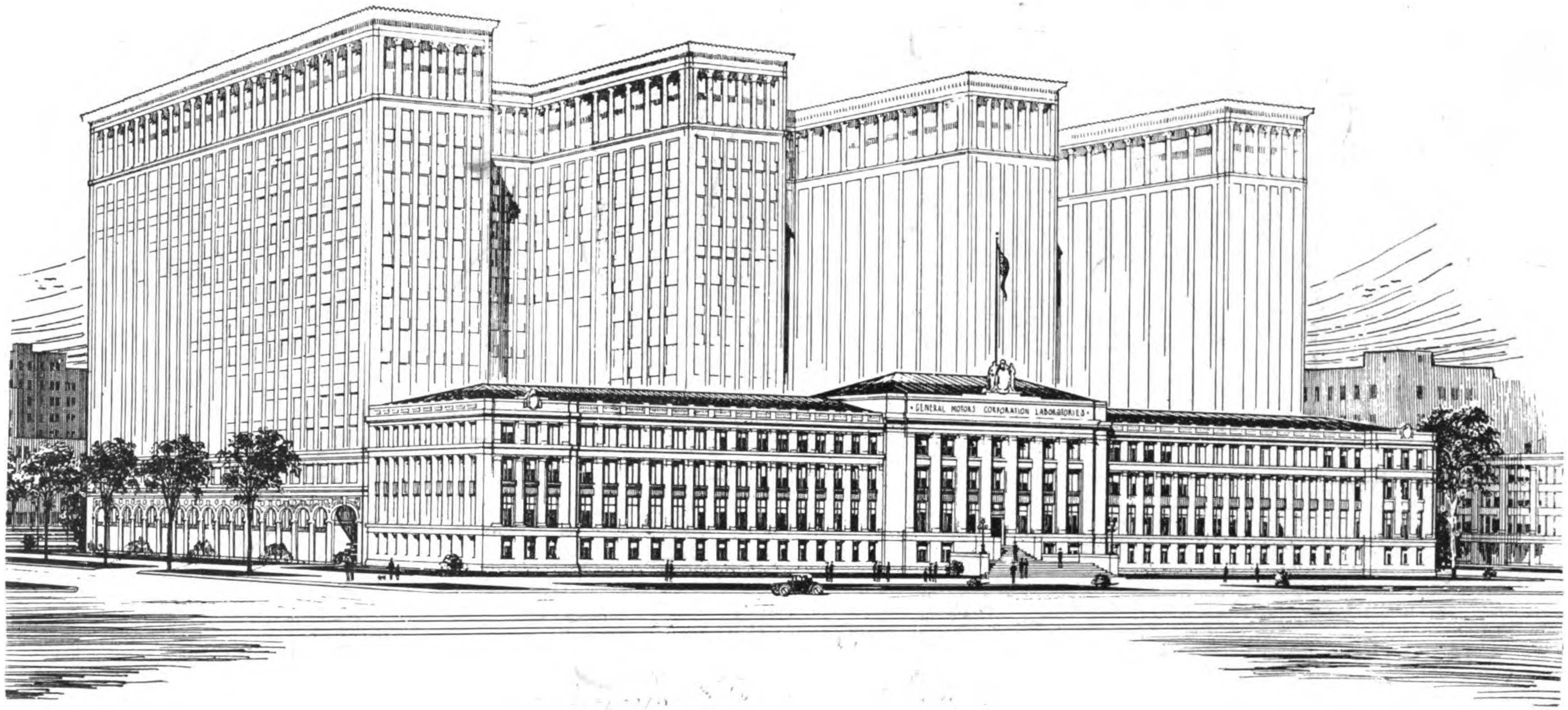
The new branch building is a five story building with simple brick facade. It is equipped for the work of the association and is provided with every convenience for the comfort of its members. The basement is given over to the cafeteria with accommodation for about a hundred, a modern kitchen, well appointed pantry, room



ARCHITECTURE AND BUILDING. Plate 37.

DURANT BUILDING (GENERAL MOTORS CORP.), DETROIT, MICH.
Albert Kahn, Architect.

Built by Thompson-Starrett Co.; buff Bedford Indiana limestone supplied from P. M. B. Quarry of the Indiana Quarries Co.; cement—Winkworth Fuel & Supply Co.; pipe made by A. M. Byers Company; vacuum traps and temperature control system—The Bishop & Babcock Company; door closers—Norton Door Check Company; sash weights—Sanborn Sectional Weight Co., Inc.; night watch and fire alarm system—American District Telegraph Co.; interior marble—Tompkins-Kiel Marble Company; Otis elevators; structural steel—American Bridge Company.

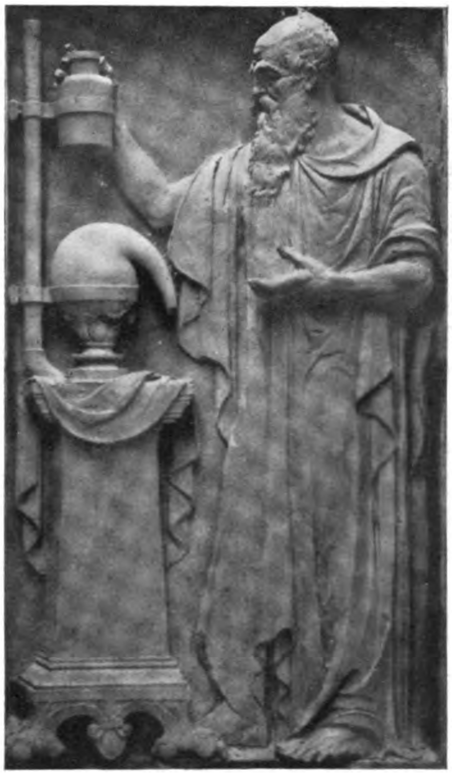


ARCHITECTURE AND BUILDING. Plate 38.

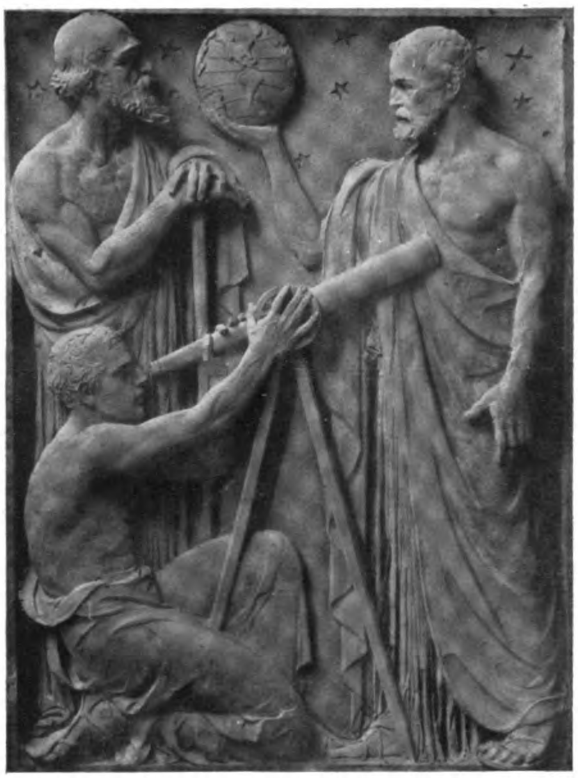
Built by Thompson-Starrett Co.; cut stone contractors—Central Oolitic Stone Co.; sheet metal work, ornamental copper stamped work, roofing and peerless skylights—The Howie Company, Inc.; elevator gates—Quincy Elevator Gate Co.; weatherstrips—Monarch Metal Products Co.; sash pulleys—Coleman Hardware Co.; interior woodwork—Alfred Struck Company; asbestos pipe covering—Columbia Asbestos Mfg. Co., Inc.; structural steel—American Bridge Company.

DURANT BUILDING (GENERAL MOTORS CORP.), REAR VIEW, SHOWING LABORATORIES, DETROIT, MICH.

Albert Kahn, Architect.

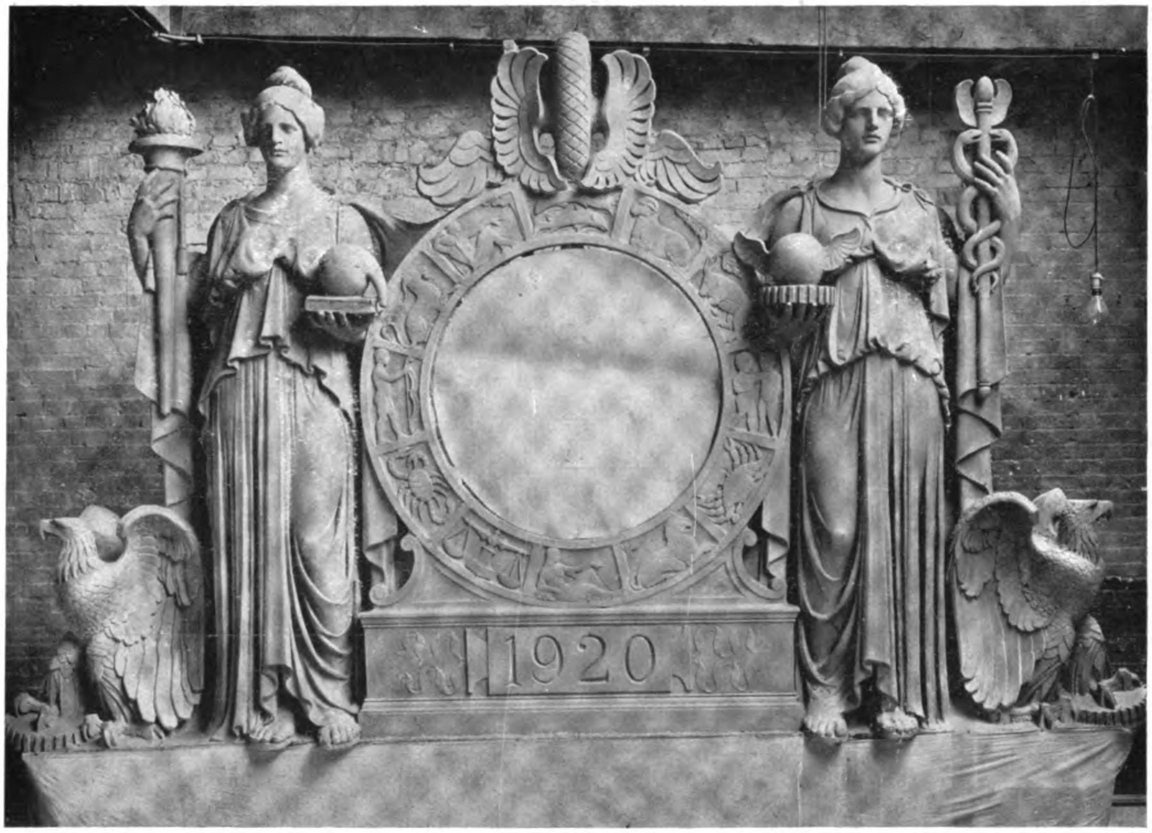


CHEMISTRY.

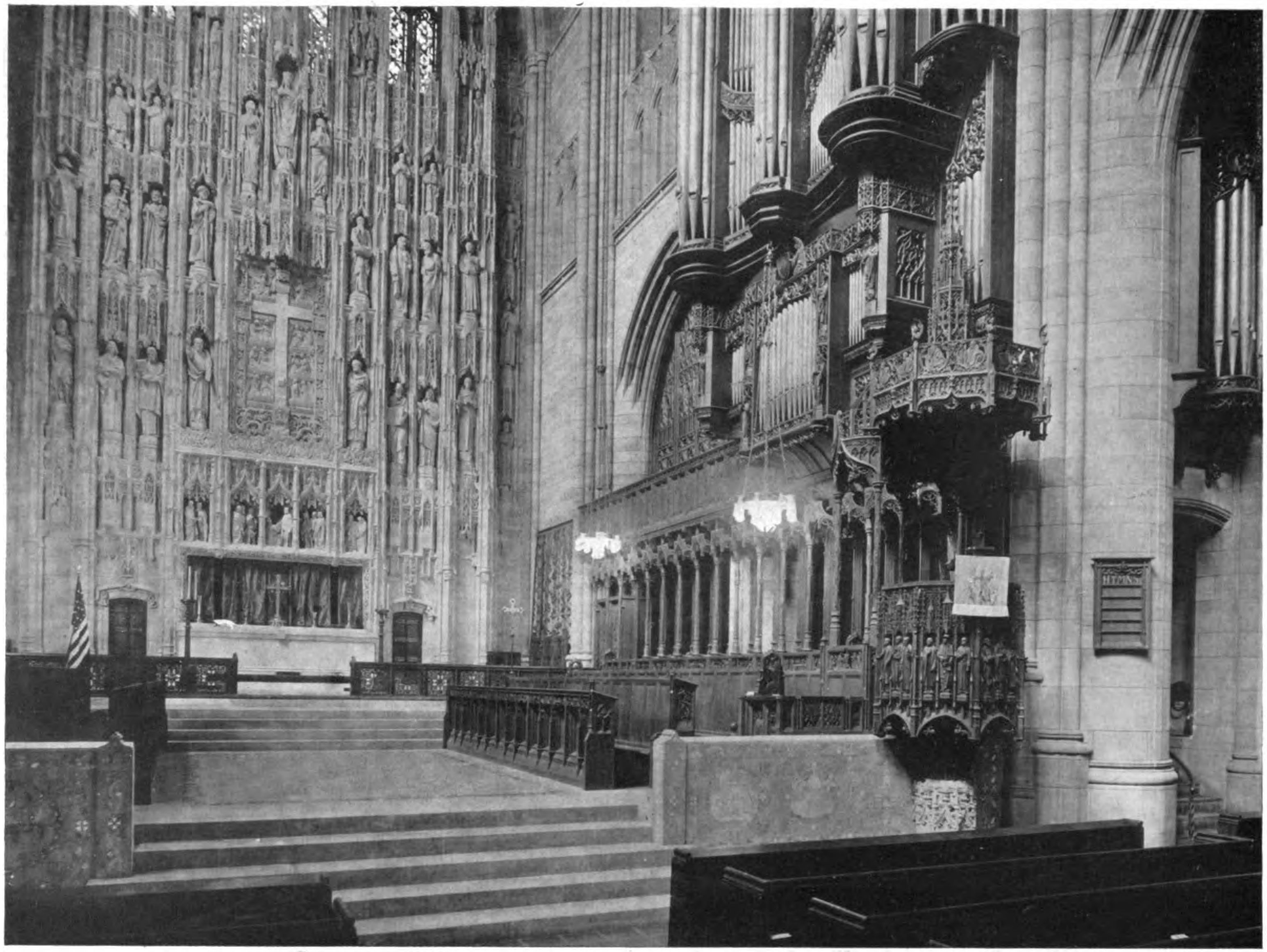


ASTRONOMY.

BAS-RELIEFS OVER LABORATORIES, DURANT BUILDING.



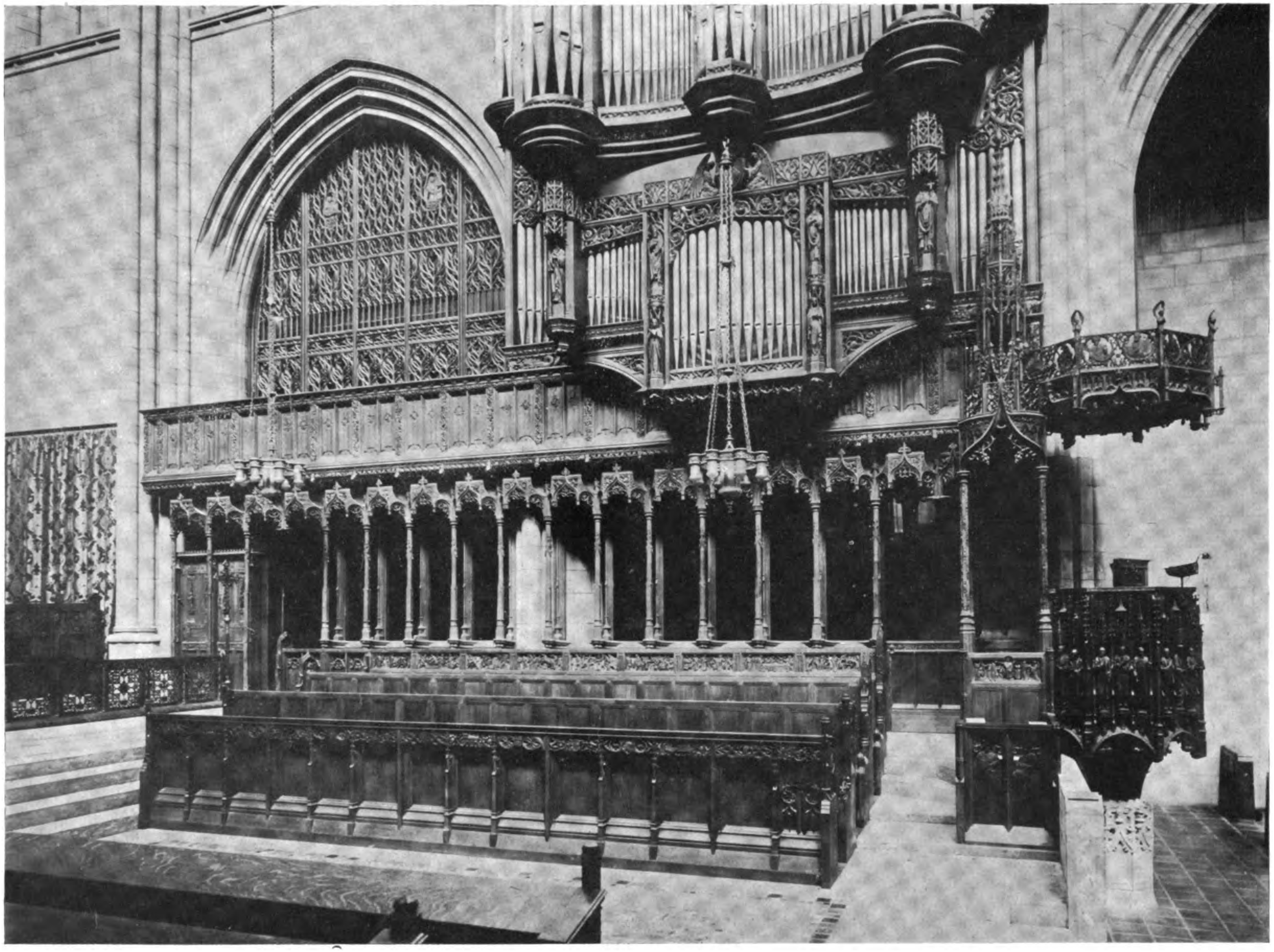
DETAIL OF CLOCK MODEL, DURANT BUILDING, DETROIT, MICH.
Ulysses R. Ricci, Sculptor.



VIEW FROM CENTRE AISLE. SHOWING CHOIR STALLS AND PORTION OF REREDOS. ST. THOMAS CHURCH, FIFTH AVENUE AND 53D STREET, NEW YORK.

Bertram G. Goodhue, Architect.

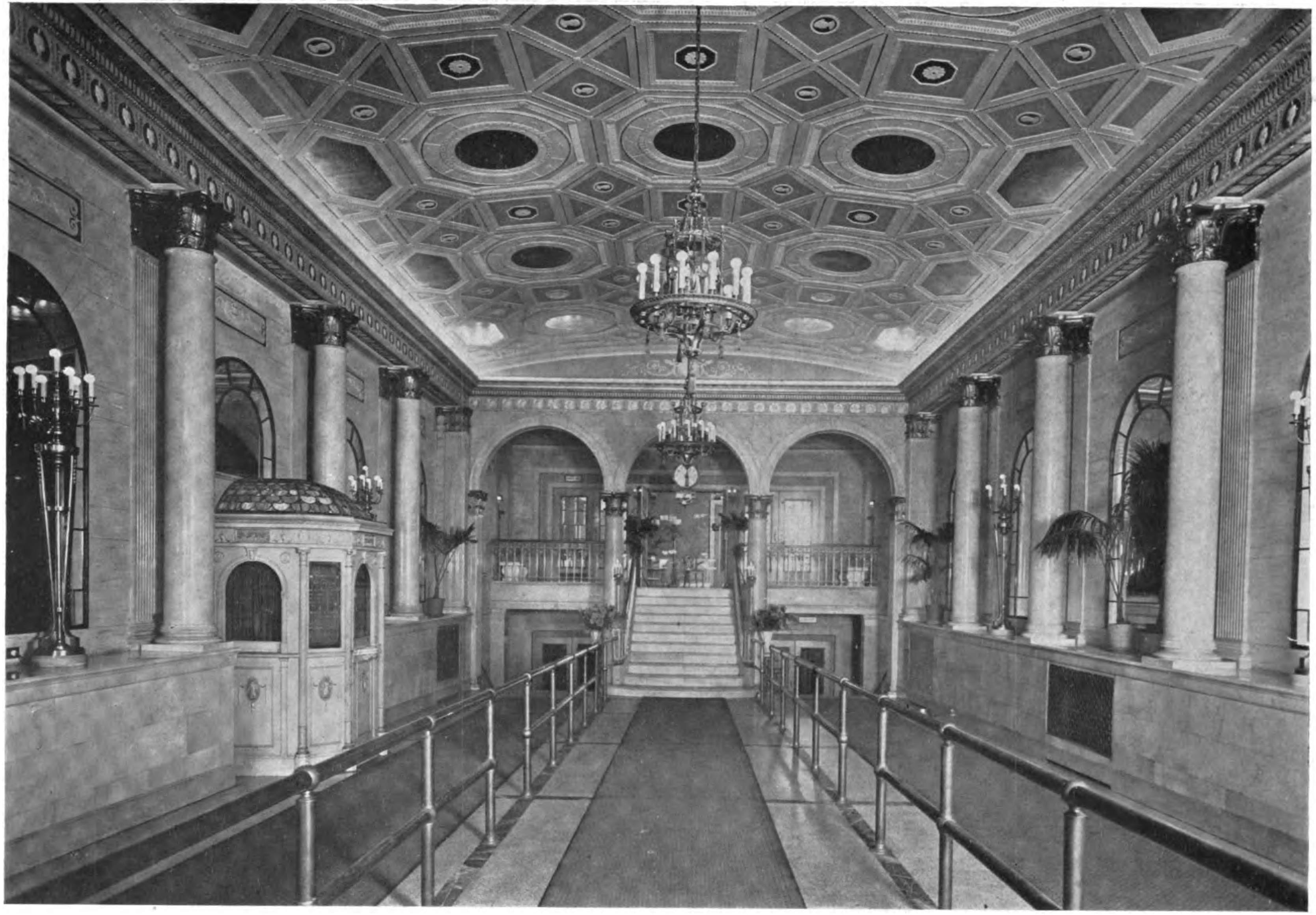
ARCHITECTURE AND BUILDING. Plate 40.
Carved woodwork—Irving & Casson-A. H. Davenport Co.



DETAIL VIEW OF CHOIR STALLS AND ORGAN, ST. THOMAS CHURCH, FIFTH AVENUE AND 53D STREET, NEW YORK.

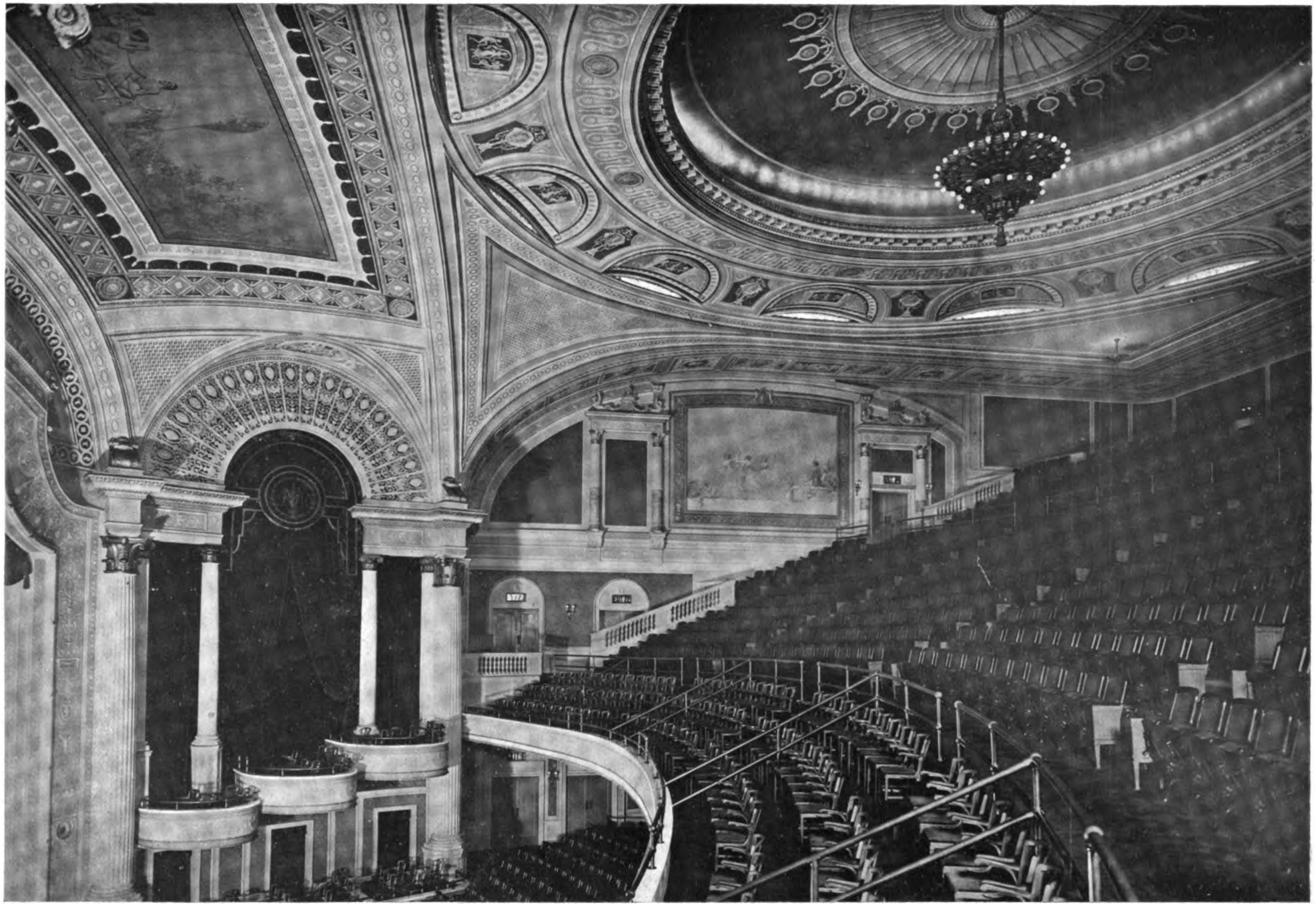
Bertram G. Goodhue, Architect.

ARCHITECTURE AND BUILDING. Plate 41.
Carved woodwork—Irving & Casson-A. H. Davenport Co.



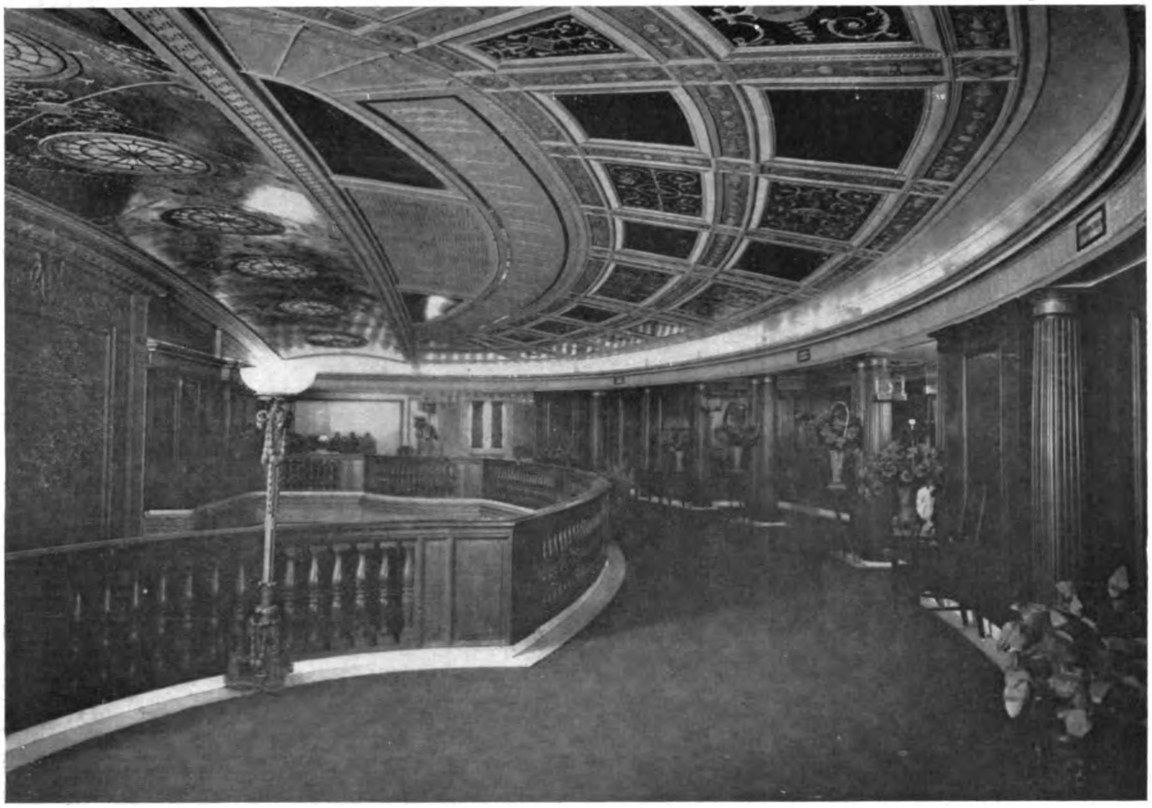
LOBBY, PALACE THEATRE, WASHINGTON, D. C.
Thomas W. Lamb, Architect.

ARCHITECTURE AND BUILDING. Plate 42.
Built by Fleischmann Construction Co.; ornamental and plain plaster—Architectural Plastering Co., Inc.; "panik-prufe" doors—Panic Proof Products Corporation.

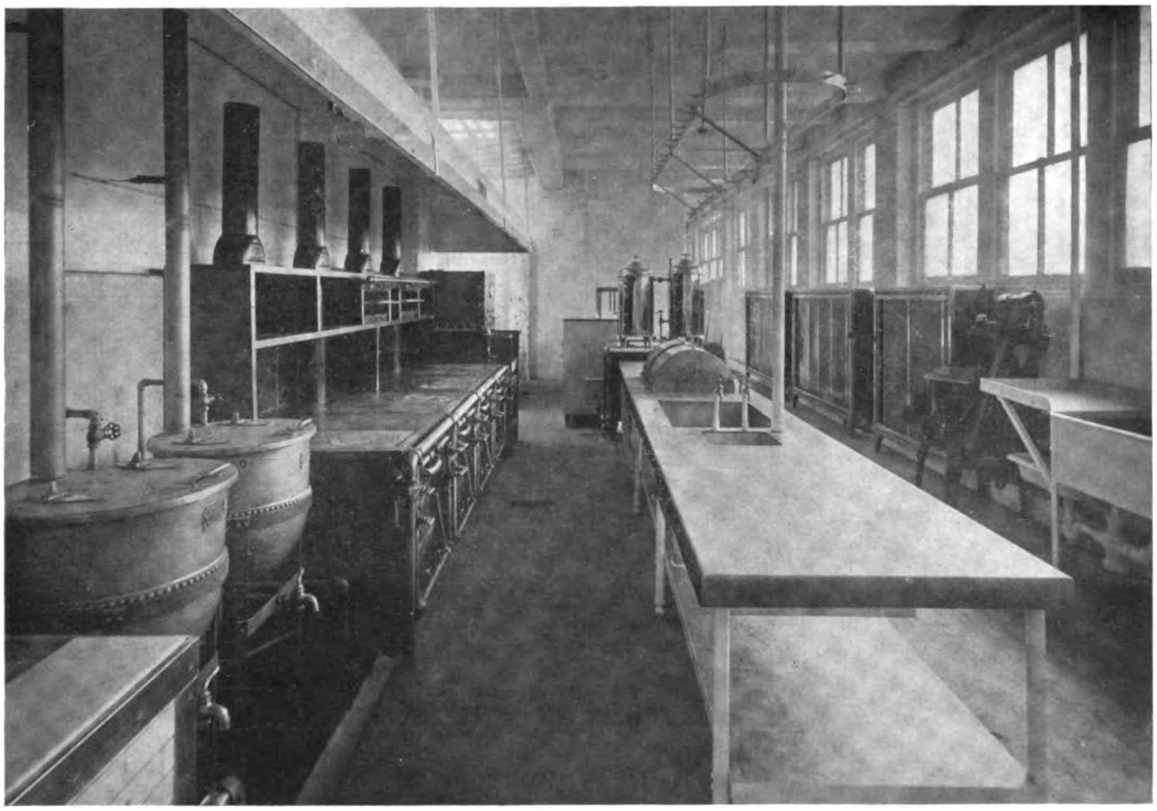


AUDITORIUM, PALACE THEATRE, WASHINGTON, D. C.
Thomas W. Lamb, Architect.

Architecture and Building. Plate 43.
Built by Fleischmann Construction Co.; murals and decorations—Wm Eckart Studios.

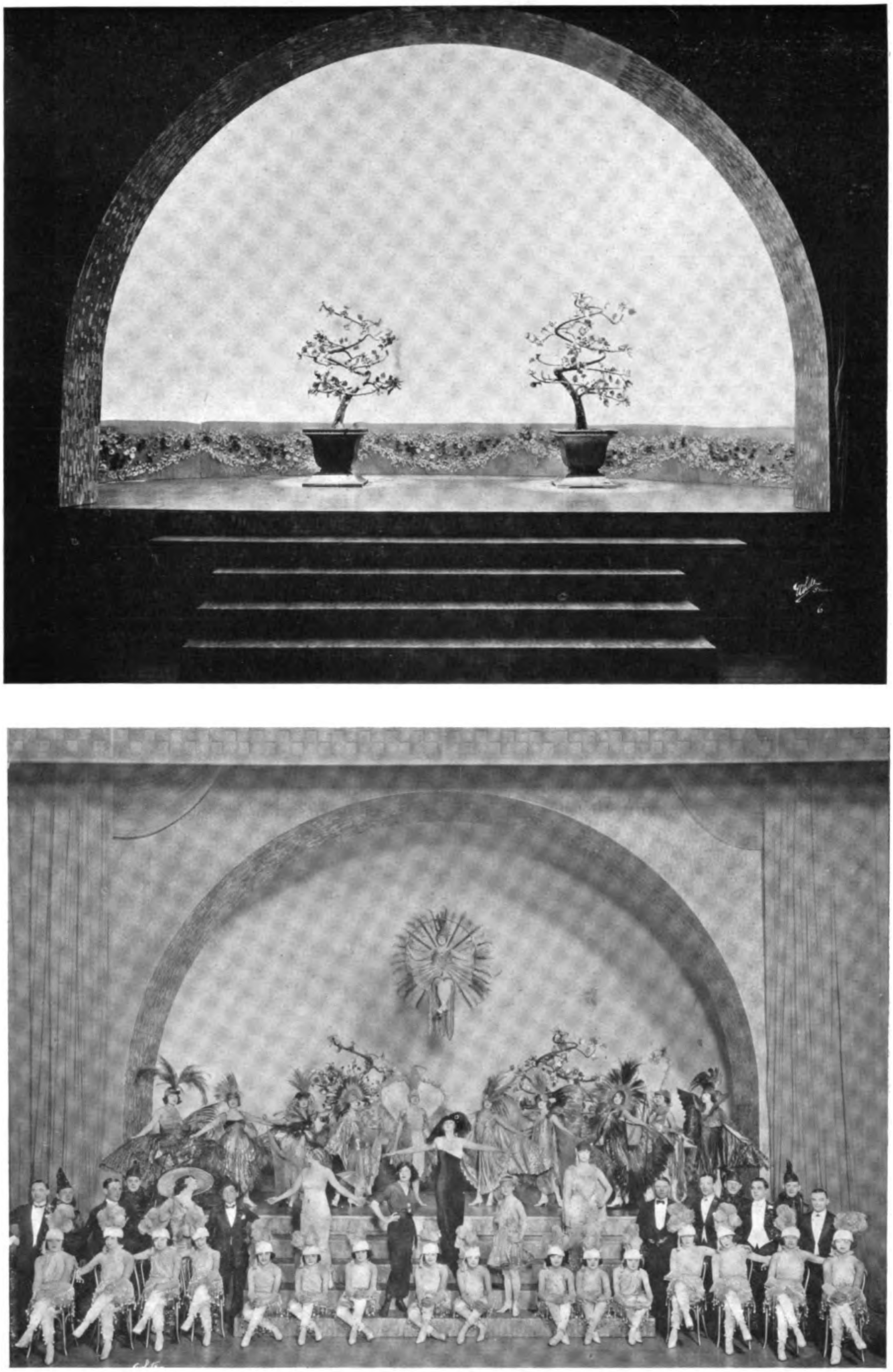


MEZZANINE, PALACE THEATRE, WASHINGTON, D. C.
Ornamental and plain plastering—Architectural Plastering Co., Inc.



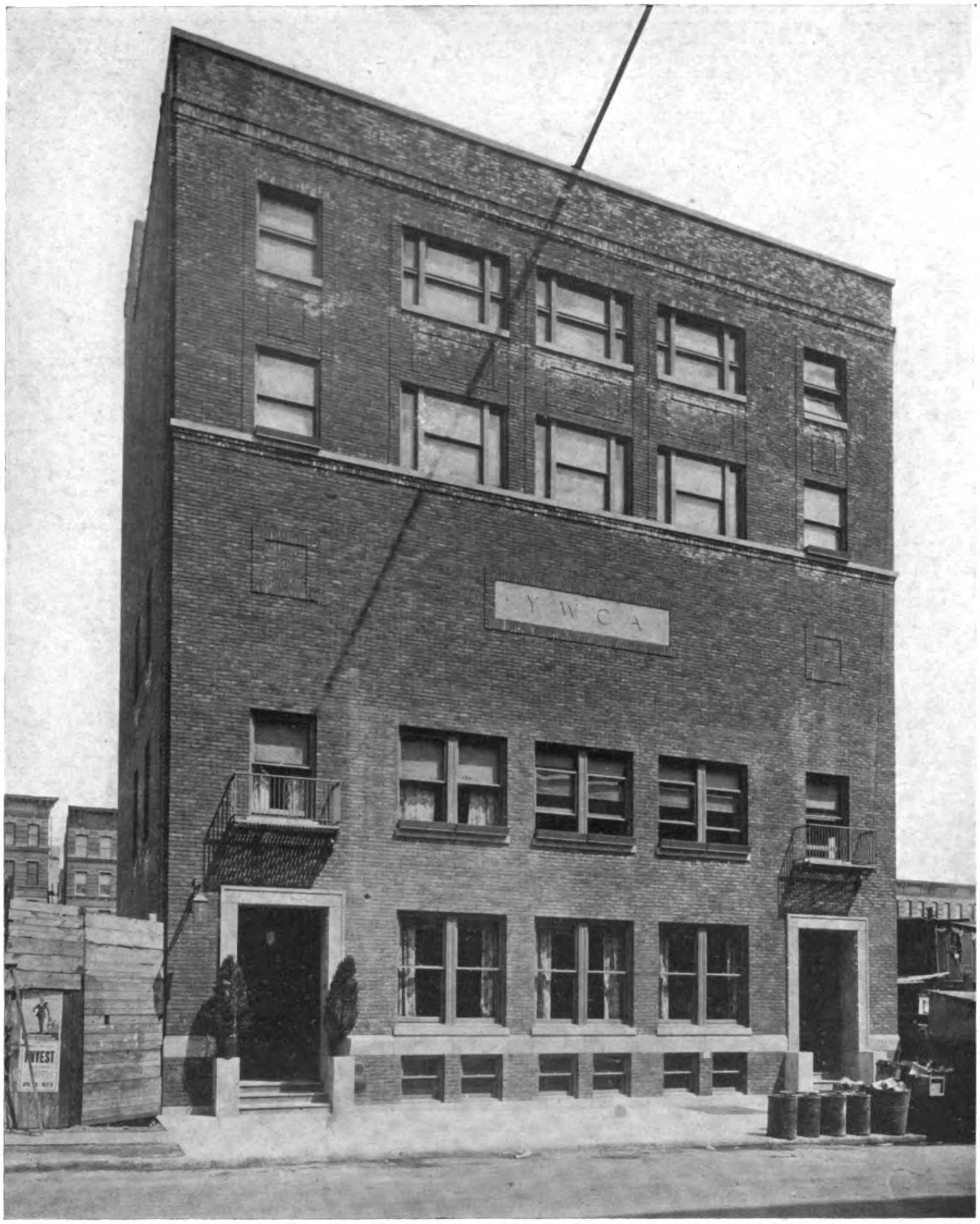
KITCHEN, ZIEGFELD FOLLIES, AMSTERDAM ROOF GARDEN, NEW YORK.

Kitchen equipment—L. Barth & Son.



STAGE DECORATIONS, ZIEGFELD FOLLIES, AMSTERDAM ROOF GARDEN, NEW YORK.

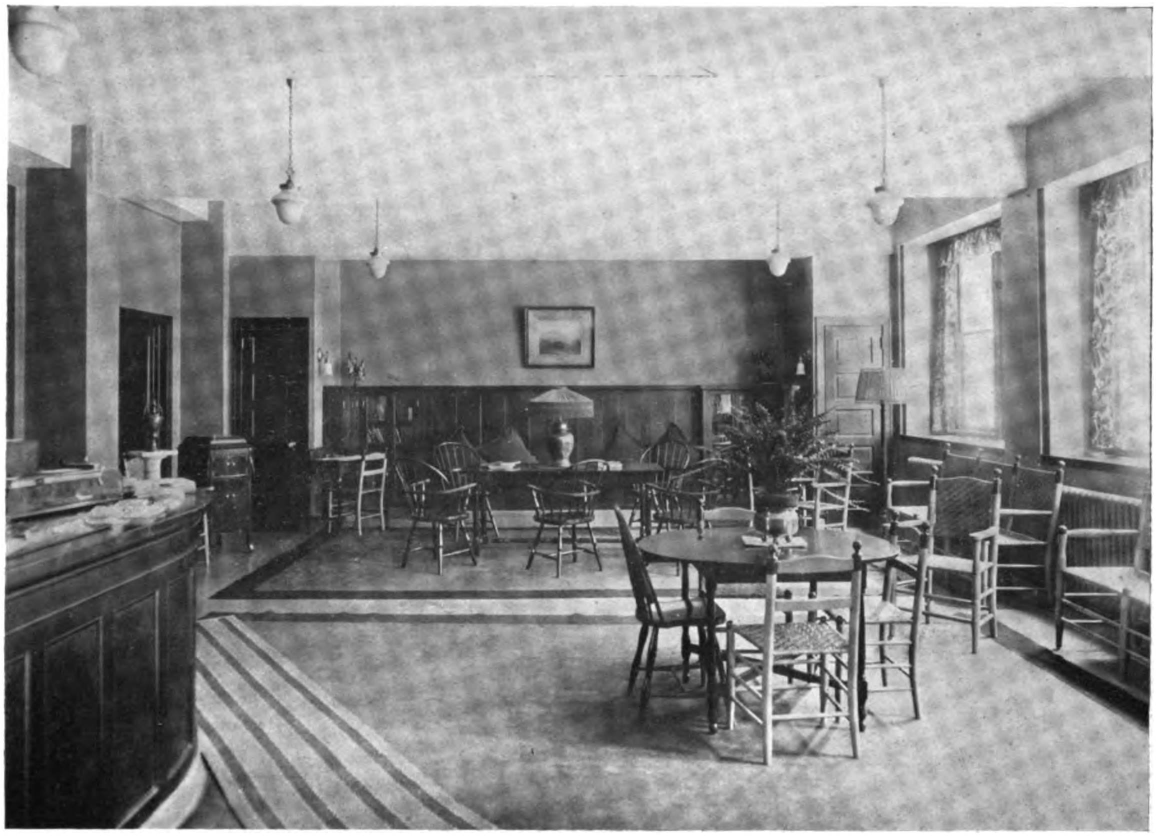
ARCHITECTURE AND BUILDING. Plate 45.
Stage lighting apparatus—Universal Electric Stage Lighting Co.

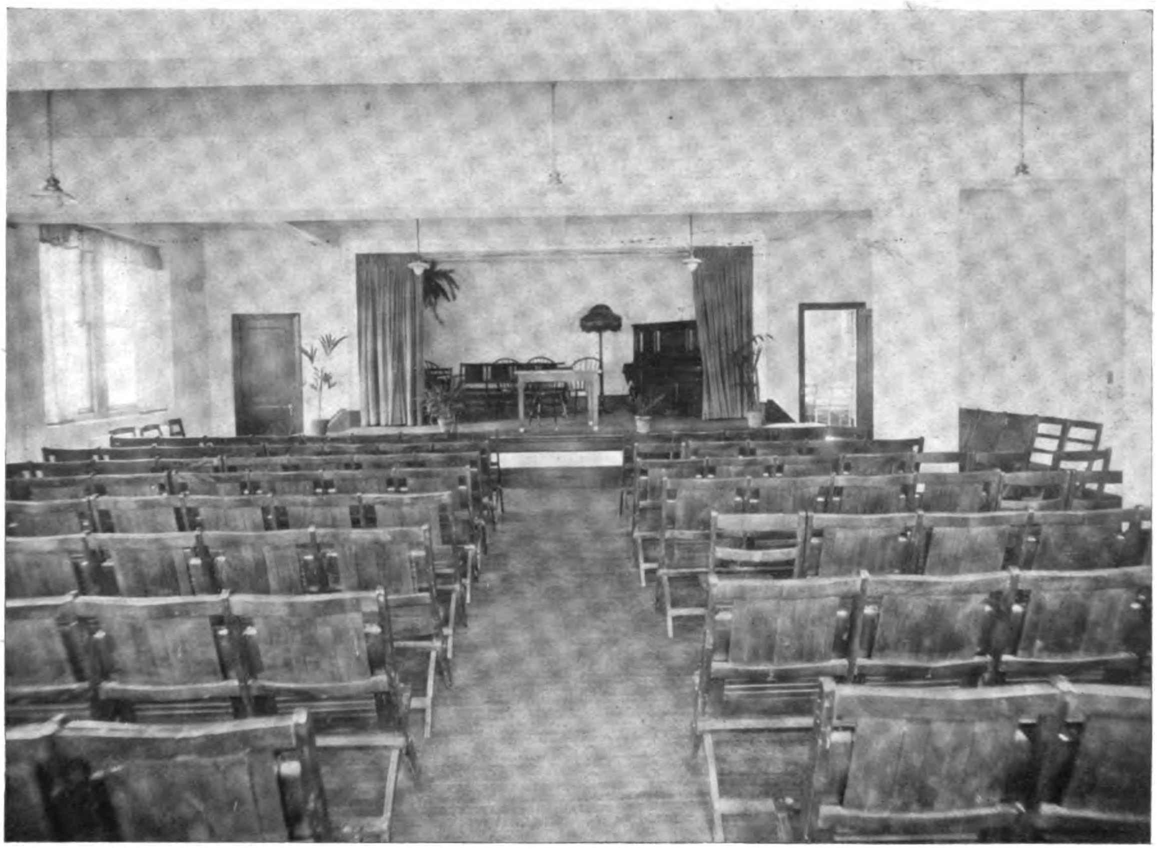


Y. W. C. A. BUILDING, COLORED WOMEN'S BRANCH, 179 WEST 137TH STREET, NEW YORK.

J. J. Pettit, Architect.

Architecture and Building. Plate 46.
Built by Tucker & Lewis; ornamental iron—A. Perlman Iron Works; swimming pool —William H. Jackson Co.

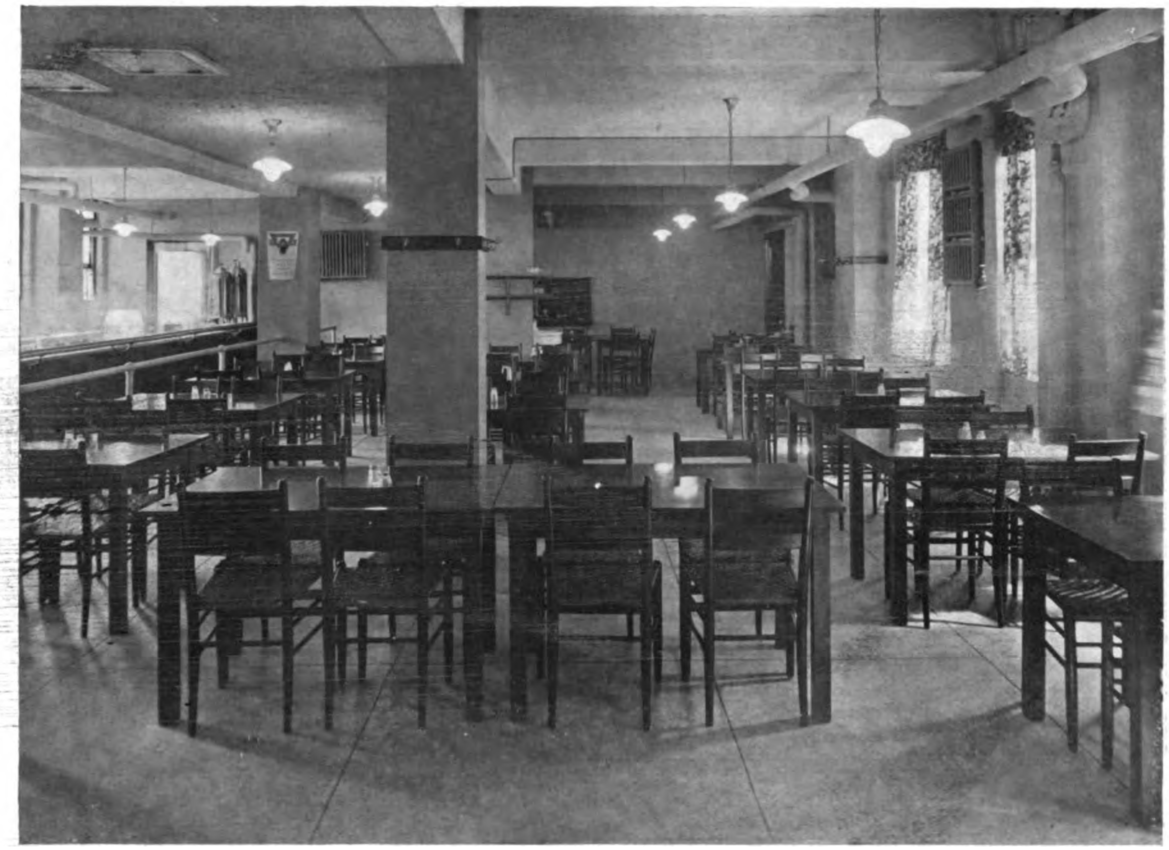


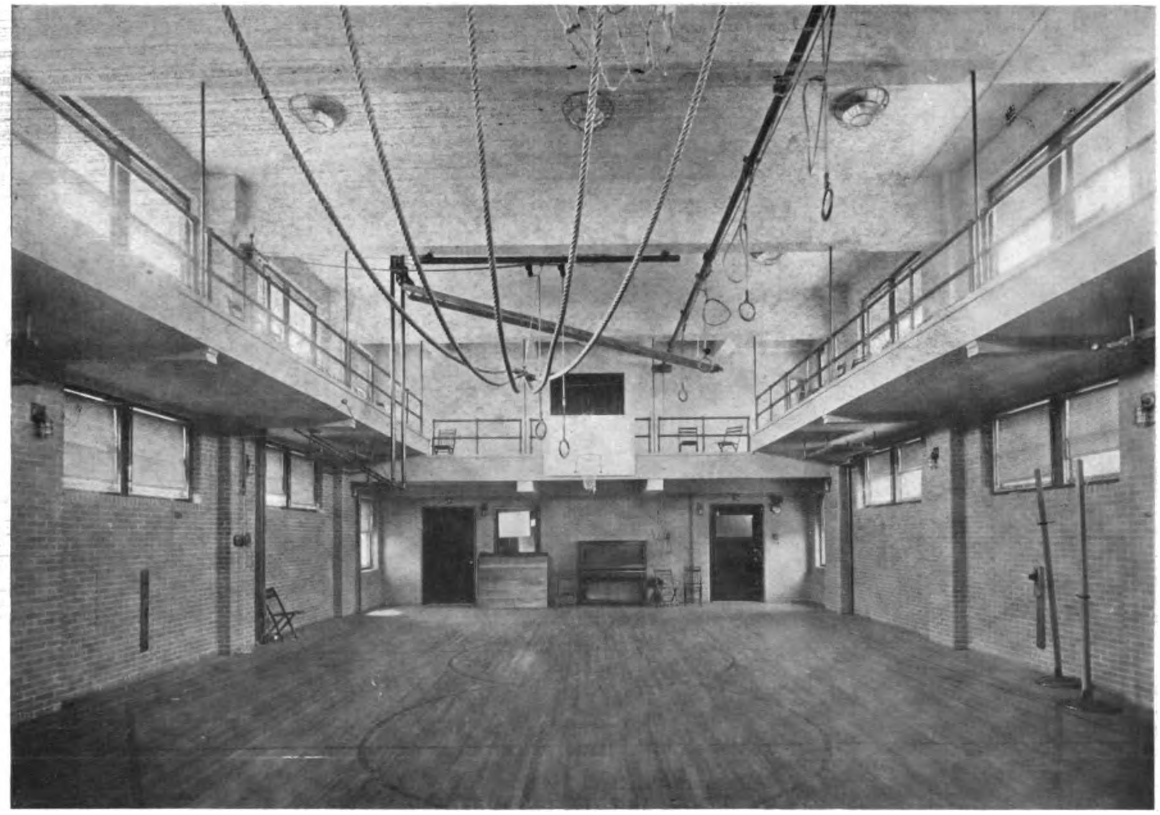


RECEPTION HALL AND AUDITORIUM, Y. W. C. A. BUILDING, 179 WEST 137TH STREET, NEW YORK.

J. J. Pettit, Architect.

ARCHITECTURE AND BUILDING. Plate 47.
Built by Tucker & Lewis; interior furnishings—Barnett Phillips Co.

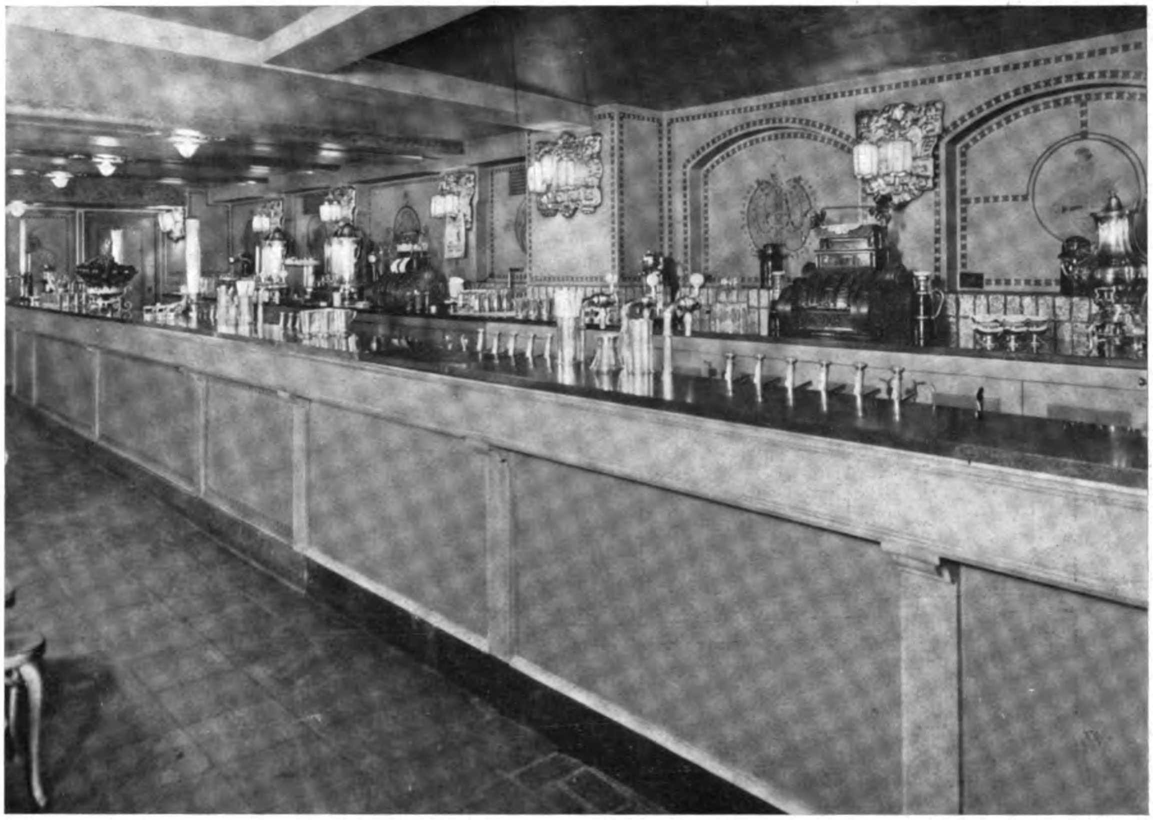




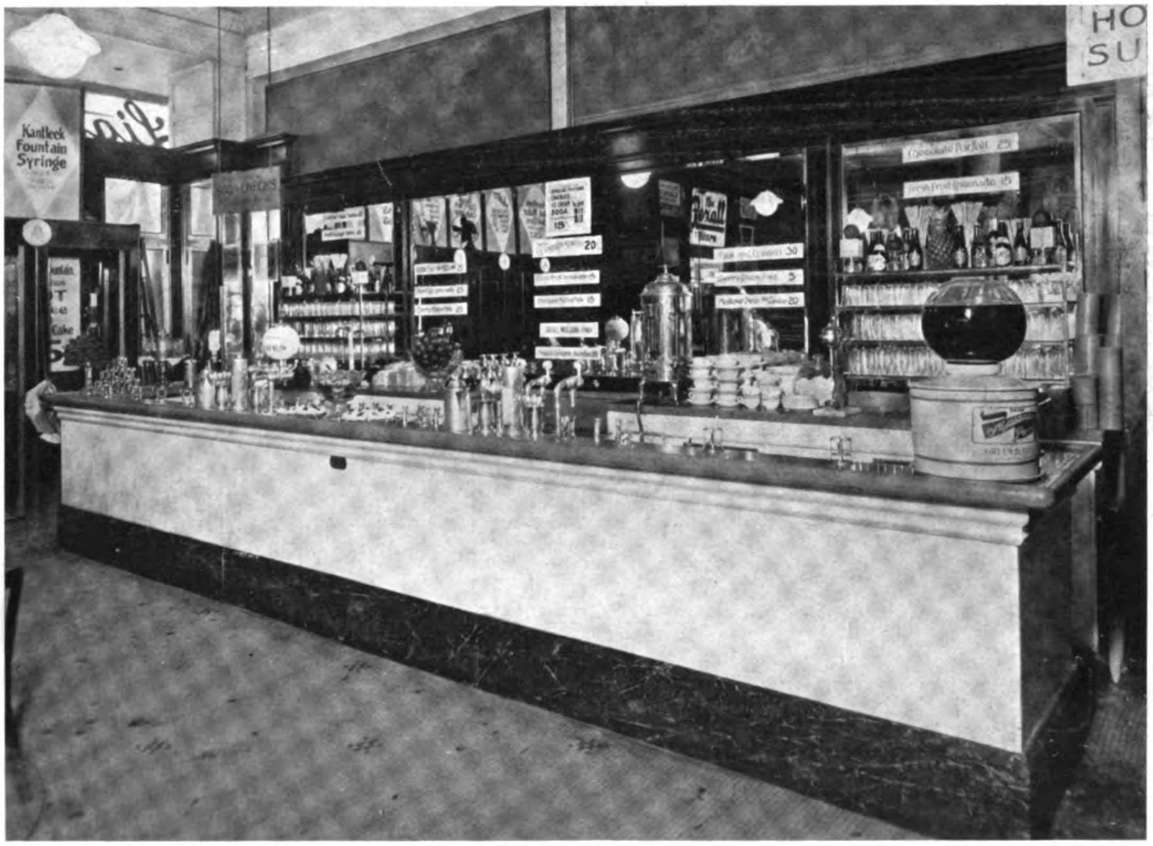
CAFETERIA AND GYMNASIUM, Y. W. C. A. BUILDING, 179 WEST 137TH STREET, NEW YORK.

J. J. Pettit, Architect.

ARCHITECTURE AND BUILDING. Plate 48.
Built by Tucker & Lewis; plastering—D. McPherson.

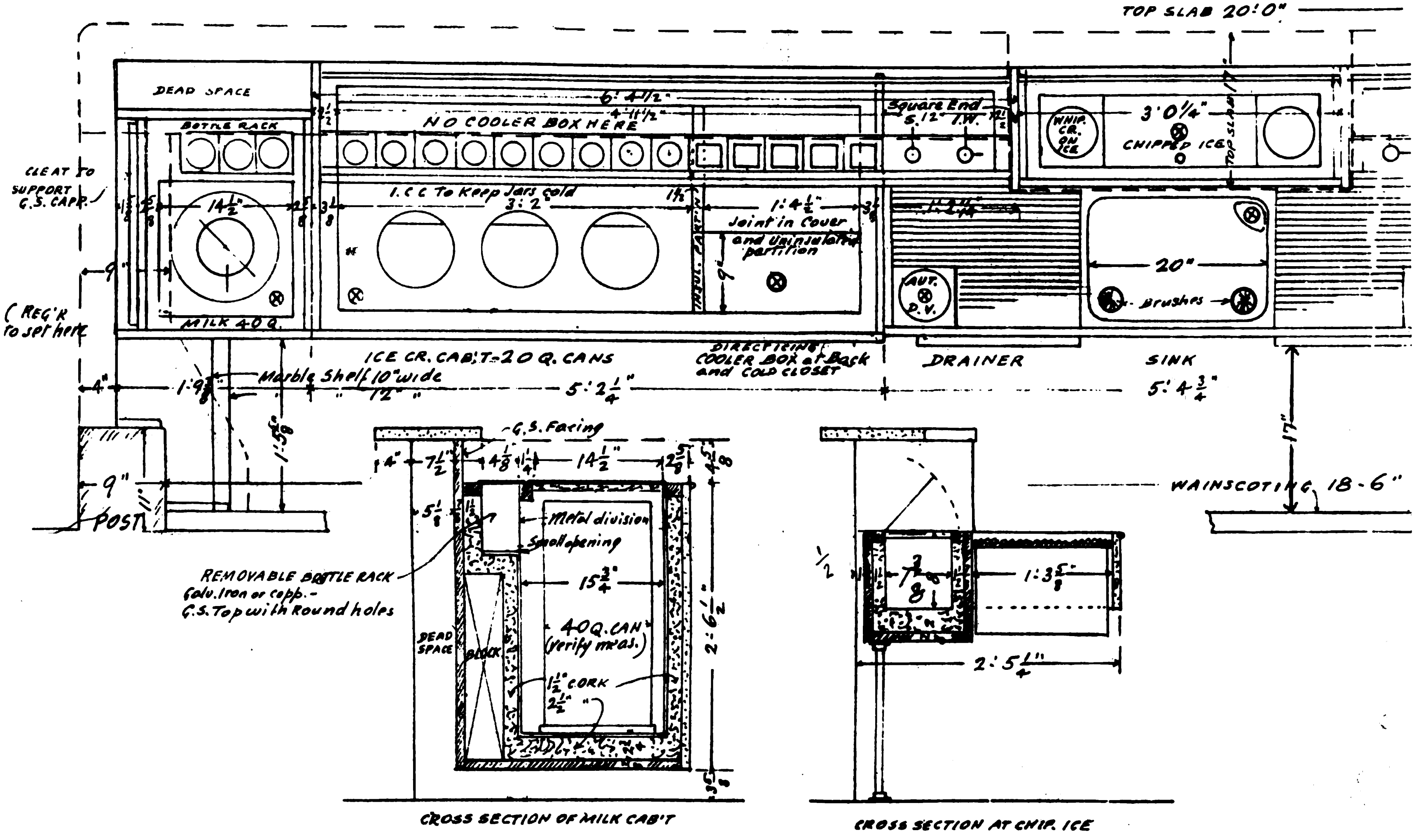


SODA FOUNTAIN LOCATED IN THE CLARIDGE HOTEL, NEW YORK.

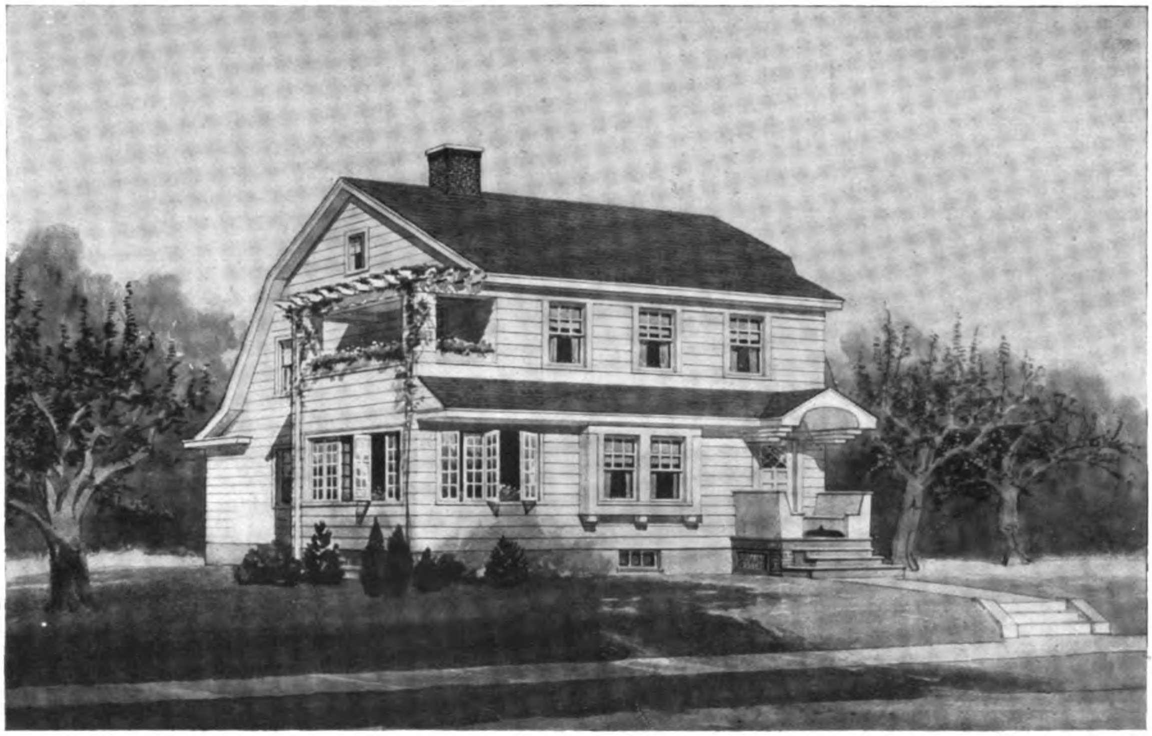


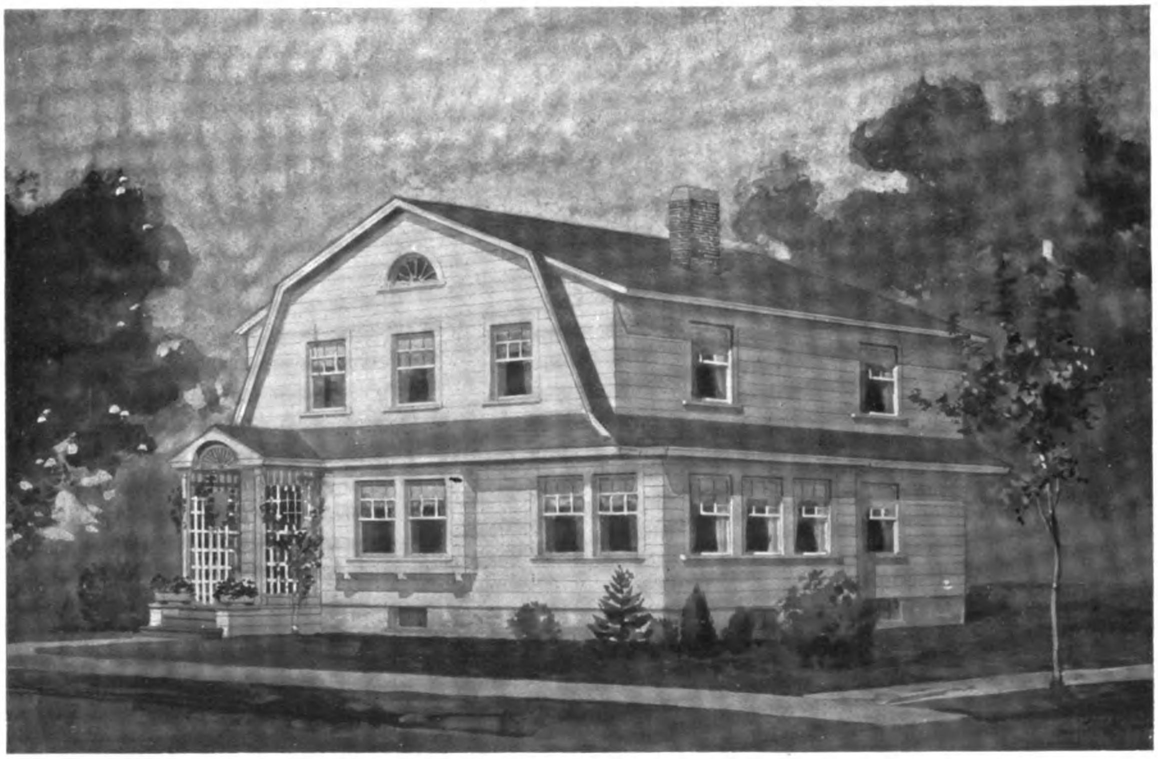
SODA FOUNTAIN LOCATED IN LIGGETT'S DRUG STORE, 71ST STREET AND BROADWAY, NEW YORK.

ARCHITECTURE AND BUILDING. Plate 49.
Soda fountain installation—M. H. Petigor.



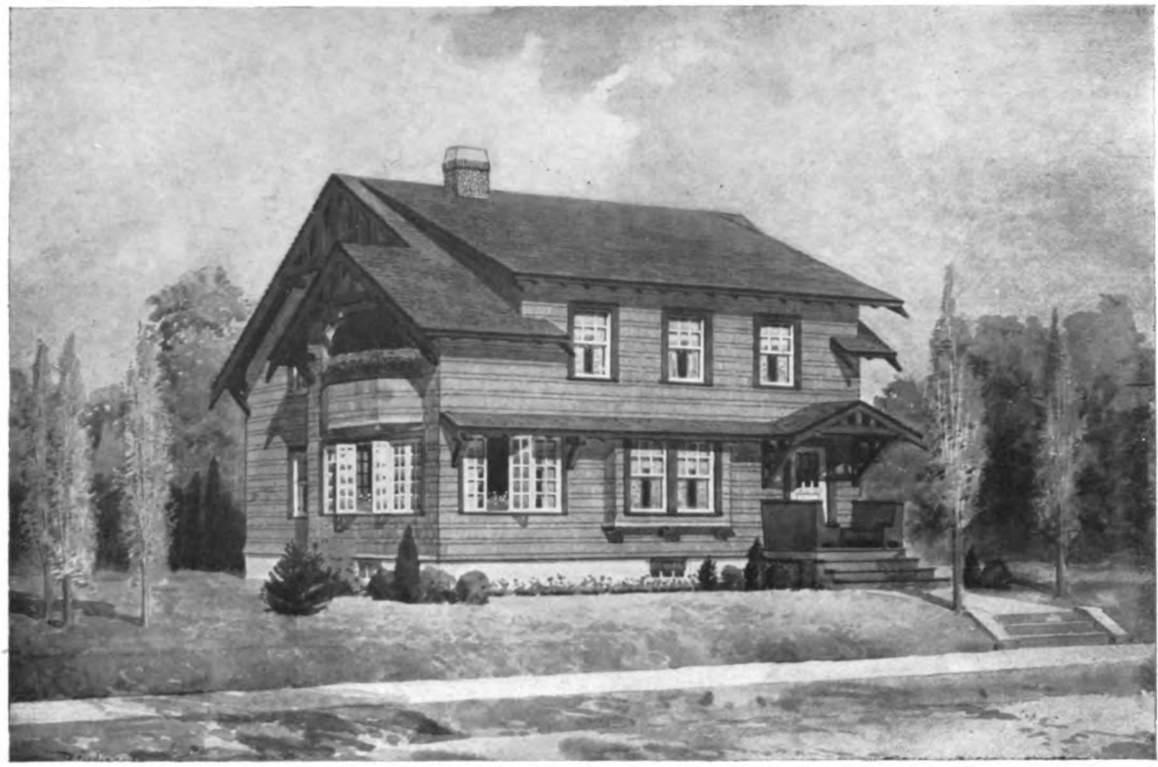
PLAN OF FOUNTAIN FOR THE GEM FOUNTAIN CORPORATION, BUILT BY L. A. PROUTY CO.

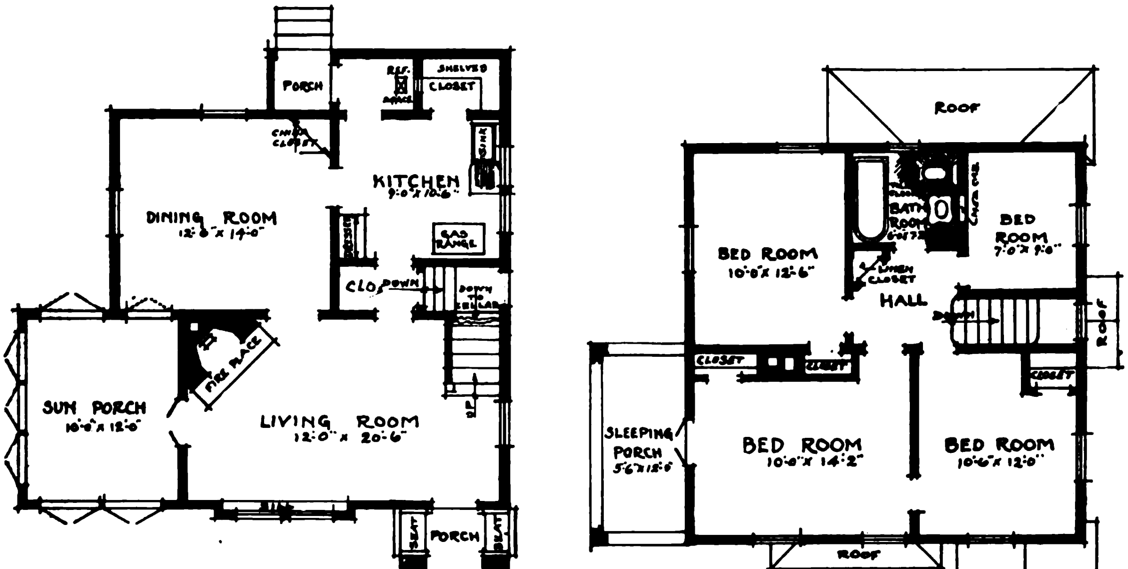




PERSPECTIVES OF TWO COLONIAL HOUSES AT NUTLEY, N. J. THE PLAN OF ONE BEING THE REVERSE OF THE OTHER. PLAN SHOWN IN PLATE 4.

William A. Lambert, Architect.





PERSPECTIVE OF EIGHT-ROOM SHINGLE HOUSE AT NUTLEY, N. J.
William A. Lambert, Architect.

for food storage, cold storage, men's lobby and lavatory, and the heating plant. In the main story are to be found the information desk, check room, reception room, committee room, general and membership offices, and the assembly room. The second story contains the employment offices, members' and girls' club rooms, commercial classroom, sewing room, power machine operating room, domestic science kitchen, pantry and dining room, manicuring and hair dressing classroom, and women's room. The third story contains shower baths and dressing rooms, lockers, laundry and driers for bathing suits, and gymnasium club room. The swimming pool is in the fourth story and here also are the gymnasium and the gymnasium director's office. The fifth story is a mezzanine overlooking the swimming pool and gymnasium, containing the examining physician's office and examination room.

The desgin for this building was drawn by J. J. Pettit, and the building was erected by Tucker & Lewis. D. McPherson did the plastering work.

THE SODA FOUNTAIN SHOP.—III.*

The plan of the fountain counter is subject to considerable variation in accordance with the ideas of various manufacturers and the requirements of those engaged in the operation of fountains. A general survey of the different types of fountains on the market shows, however, certain uniformity of general dimensions and about the same main component parts which go to make up the complete fountain. These main parts may be differently grouped and many special devices are offered by different manufacturers as appurtenances of the fountains they manufacture but in the main essentials a fountain must contain a set of syrup pumps, soda draft arms, ice cream cabinet, milk cabinet and pump and wash board and sink.

The Gem Fountain Corporation has developed a type of soda fountain bar to meet their requirements which is uniform in design and planned to economize the motions of the employe dispensing. The following description is based upon the latest improvements that they have made in designing their fountains, several of which have been illustrated in previous articles. In general the fountain consists of a front and back bar. Mouldings, ornamental features and irregular surfaces are eliminated to the fullest extent so as to make the entire equipment as easy as possible to clean and operate at all times. The back bar is made 8 feet 10 inches in height to the top of the cornice. The main shelf is 41 inches from the floor and above it are the pastry closets, etc. This back bar contains all of the hot or non-refrigerated service. Below the counter are storage closets, warming closets, disk racks, etc. Above are placed the pastry closets, coffee urns and display closets. Each pastry closet is made in two sections and contains four shelves each 5 inches apart, making five storage spaces. Pastry is put upon plates ready to serve in the morning so that during rush hours no time is wasted in preparing portions. The height of the closet is 29 inches and it is 5 feet long. The peak above the shelves is used for displays. In between the closets the coffee urns are placed and above them are spaces for signs, giving the menu and prices. A narrow shelf just below the cornice also provides a place for display signs.

The front counter bar is 41 inches from the floor and the top slab may be from 14 inches to 18 inches wide. It is provided with shelves used for stacking sandwiches and napkins. In this front counter is placed all of the refrigerating equipment and cold storage. The arrangement consists of a drain board with cooler located under it, next a wash sink, then the milk pump and the ice cream cabinets. The soda draft arms come up through the counter and are placed about opposite the wash sink. The syrup taps are just back of the counter and extend along over the drain board and ice cream cabinets. In the latest designs, one central cooling station is provided for all of the draft arms, thus economizing ice and labor in replenishing. There are in addition small cooling stations at the base of each draft arm, which will hold about ten pounds of ice, an amount sufficient to last all day in winter. In winter these small stations are sufficient so that the central station need not be iced at all, but in summer all are iced. This method of icing is a feature of the Braunstein equipment.

The syrup taps are in groups of from 7 to 10 giving as many different flavors. All pipe and drain connections are made above the floor where they are accessible at all times and can be easily cleaned or repaired and connections through the floor are reduced to the smallest number. Running water is provided to all coffee urns which are heated by gas.

The scheme of the arrangement makes for very rapid service with the minimum of effort on the part of the dispensers. Such units as described are installed one after the other along the length of the counter and each dispenser has his own position with everything available for his needs without the necessity of at any time passing the man next to him. Each dispenser has access to a coffee urn, a pastry closet, soda water draft arms, a set of syrup taps and an ice cream cabinet. He shares the pastry closet and the ice cream cabinet with the man next to him but otherwise works with his own equipment. Motor driven mixer machines are also provided for each dispenser. In addition each man has his own drain board and sink and milk pump.

Service during rush hours is most expeditious, as sandwiches on the counter shelves may be obtained by the customer himself and eaten while he is awaiting his drink and orders for pastry, etc., can be provided before he has finished eating. By 11:30 everything is in readiness for the rush hour and the coffee urns are filled at this time and have sufficient capacity to supply the demand until 2 p. m. so that the entire efforts of the dispensers can be devoted to service and no replenishing of supplies is necessary until the rush hour service is over.

The two illustrations of soda fountains shown on one of the accompanying plates are examples of recent equipments in one of the Louis K. Liggett Company's drug stores and in the Hotel Claridge. Both were installed by the Petigor Soda Fountain Co. and merit special description.

The Claridge fountain has a long counter, most completely appointed and designed suitably in keeping with the interior. A deep shelf at the back provides space for cash registers, urns, mixing machines and extensive storage space for glassware, with a large amount of storage space in closets below the shelf. The fountain in the Liggett drug store at Seventy-first street and Broadway is not so large, but is equally well appointed.

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Both fountains are most attractive in their simplicity of design and general air of neatness and cleanliness. Food is served at the counter in the drug store, while in the Claridge provision is made for refreshments only.

There are features of the Petigor design and equipment of special interest. The draught arm valve has a lever pivoted in the center so that there is a positive, quick action in either direction. The only wearing parts are the spindle and thimble, which can be replaced with a screw-driver in five minutes. There is nothing to get out of order, so that there is no danger of a breakdown to delay service. The milk pump forces the milk from the bottom of the container by a single stroke of the lever handle. The stirring device, actuated by a separate rod, is an improvement in that it stirs the entire contents from top to bottom of the jar. The syrup pump is dripless and gives an accurate measure. The cup of the pump fills from the bottom so that it will draw the whole contents of the syrup jar. The parts are all removable by hand, which facilitates cleaning. There is also an improved fruit jar, which is designed with the ladle and cover in one so that the jar is always covered when not in use. The size of the ladle provides for one dip to a portion, and as the ladle connects with the cover by a universal joint the contents can always be stirred without removing either ladle or cover.

FOUNTAIN IN DECATUR, ILL. COOLED BY BRINE CIRCULATING SYSTEM.

An example of a successful soda fountain equipment is shown in a fountain at Decatur, Ill., which has a very good trade. The proprietor attributes his success to good location, good equipment and service to his patrons. The fountain was built by the Mueller Fountain and Fixture Co. and is cooled by a refrigerating plant of the brine and ammonia type wherein the circulating ammonia is immersed entirely in brine.

Wm. P. Comstock.

(To be continued)

The growing business of Mann and MacNeille, architects and construction engineers, with offices at 70 East 45th street, New York, have compelled them to open a Western branch office in the Book Building, Detroit, Mich. They give special attention to town planning and civic development.

Book Reviews

THE HOUSING BOOK. Compiled by William Phillips Comstock. New York: The William T. Comstock Company; 132 pages, 8½x11 inches, cloth. Price, net, $3.

This book presents a selection of the best that was developed to meet the housing needs of the war industries and shows what was actually produced through the efforts of the most capable designers in the country, aided and supported by the best of engineering practice. The Government had at its call what no individual ever could have and that is the best individual efforts of the most capable men spurred on by patriotism. The result may be read in the illustration of every small house that is shown in this book. The elements of planning were most extensively studied and the result is a series of plans which are most economical to build, and when built are most satisfactory. There is sufficient variety in exterior designs to meet any one's taste, both in style and in selection of material.

It is not the purpose of this book to show all that was produced in the war developments, but to show a selected variety. It is the hope of the writer that in its pages will be found the answer to the housing problem for the average individual, and that to large corporations who have taken upon themselves the housing of their employes there will be a helpful variety of suggestions. A number of village sites are shown, giving the layout of the streets and starting with the single family house, there are twin houses, double deck type for two and three families and buildings which approach the apartment in housing as many as nine families within the given four walls.

The book is handsomely and substantially bound in cloth to meet all the wear and tear that a book can stand.

THE MODEL T FORD CAR, 1920 edition revised and enlarged, by Victor W. Page. New York: The Norman W. Henley Publishing Co. Size 5x7½ inches, 2,110 pages, 153 illustrations, cloth. Price, net, $1.50.

The author presents a complete exposition of the mechanism and appurtenances of the most universally used automobile, and the book should be very welcome to many of the three million individuals or thereabouts who own and operate Fords. One of the great advantages of the book is found in the splendid diagrams which are so profusely used to explain the text. These, together with excellent photographs of many parts, makes the information in the book most accessible and of the easiest possible reference.

The instructions will meet every question that may arise in the ordinary operation of the automobile by those who lack a special knowledge of mechanics. For those drivers who have some mechanical skill there are directions for making all ordinary repairs and for the usual maintenance service for which so many rely on the garage repair man. For overhauling and extensive repairs directions are given in minute detail so that the skilled worker the book also has great value.

(Continued on page 20—Adv.)

Albert Kahn, Architect

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Architect, Diplômé Paris
Author "Indication in Architectural Design"
309 BROADWAY, NEW YORK CITY

BOOK REVIEWS.

(Continued from page 46—text)

The essential accessories of the car are also covered, such as tools, repair parts, electric lighting and starting systems in addition to the standard electrical starting devices now installed in the 1919 and 1920 automobiles.

A chapter on truck and tractor conversion sets for use with the Model T chassis is valuable and the Ford worm gear drive used on the Model T Ford truck is well described.

Two chapters are given on the Fordson tractor, considering its operation and maintenance and its repairing and varied usage. These chapters are extensively illustrated to show the many applications of the tractor to farm use.

Current Notes

Ross & McNeil, architects, have removed their office from 39 East 42nd Street, to the Monolith Building, Room 1105, 45 West 34th Street, Phone Greeley 2280.

Zink and Sparklin, Inc., and Alexander Deserty, Associate Architects, Munsey Building, Washington, D. C., announce the opening of a branch office at 110 West 24th Street, New York City. This firm specializes in theatre architecture and have at the present time eleven theatres in the course of construction. They will be pleased to receive catalogues from manufacturers of materials in the building field.

Messrs. Ballinger & Perrot, architects, engineers and constructors, announce the removal of their offices from the Wesley Building, N. W. corner 17th and Arch streets, to 329 South Broad street, Philadelphia, Pa.

The Rockwood Sprinkler Company announces the removal of its New York office from 123 William street to 25 West Forty-third street, New York.

Mr. Herbert B. Rugh and Mr. C. B. Zalesky, A. I. A., announce that they have formed a partnership for the general practice of architecture under the firm name of Rugh-Zalesky and that they will maintain a suite of offices in the Security Building, Cedar Rapids, Iowa.

EDUCATIONAL MOTION PICTURES.

The building trades and the manufacturers of building materials have fully awakened to the advantages of the motion picture as a means of exploiting their products. This might be qualified by saying that anyway some of the concerns are taking advantage of the possibilities of motion pictures. A prominent paint concern has arranged for the issuing of films to attractively bring their products before their customers. Also, there is a movement on foot to use the motion picture for the development of foreign trade, using its pictorial display possibilities to bring the products before the eye of the purchaser in other lands who speak other languages. For export trade this certainly offers great possibilities. But recently in connection with a building trades exhibit for the home builder, a special film was prepared showing the entire process of building a house; first, selecting the design, the interview with the architect, the signing of the contract with the builder, and thus through the various stages of construction to the completed and occupied home.

The largest architectural library in the Western Hemisphere and probably the second or third largest in the world is the Avery Library, which is now definitely connected with the School of Architecture of Columbia University. This library, under the direction of William B. Dinsmoor, places at the disposal of its users over 25,000 volumes relating to architecture and the allied arts. The library is located at Avery Hall on the Columbia Campus and the same building houses the School of Architecture. The library is open in the evenings as well as during the day so that the fullest opportunity is given to the public to make use of it.

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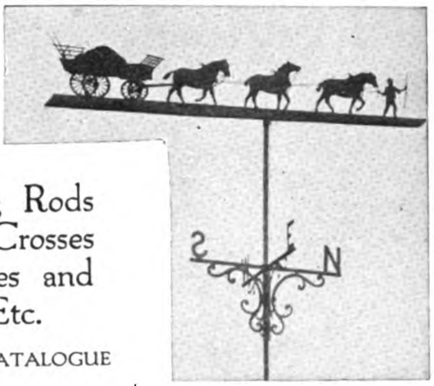

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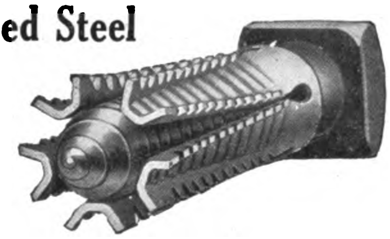

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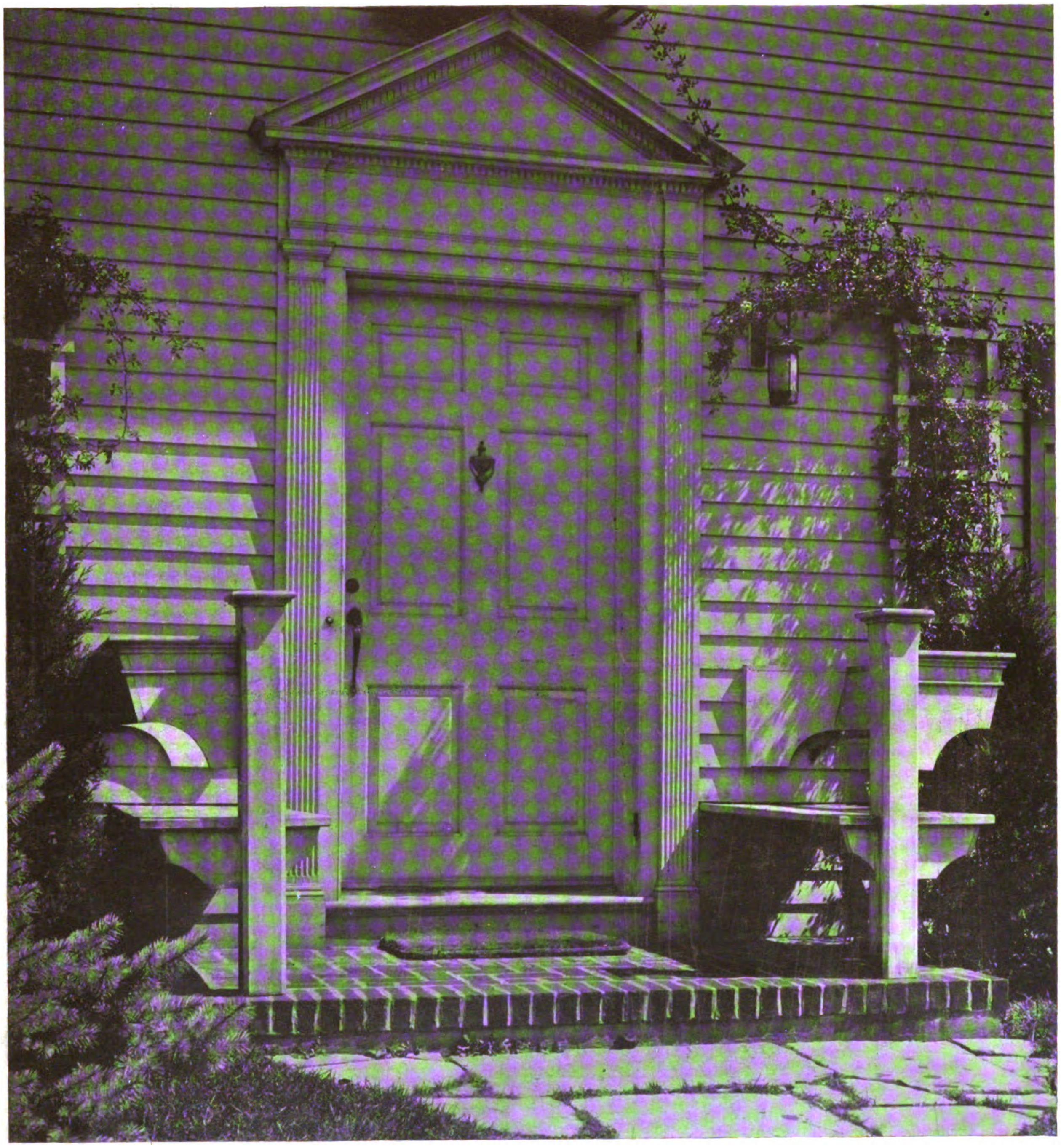

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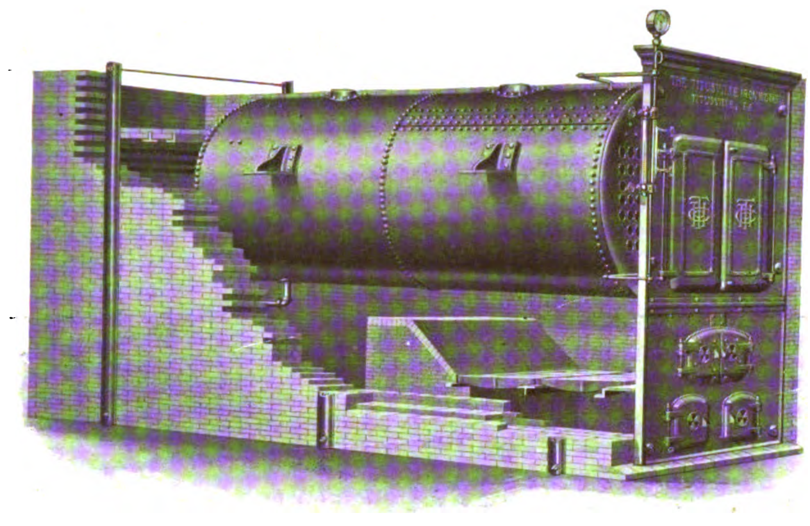

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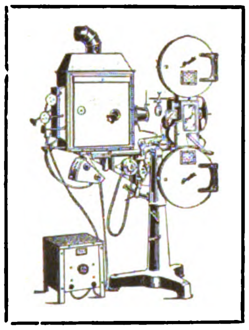

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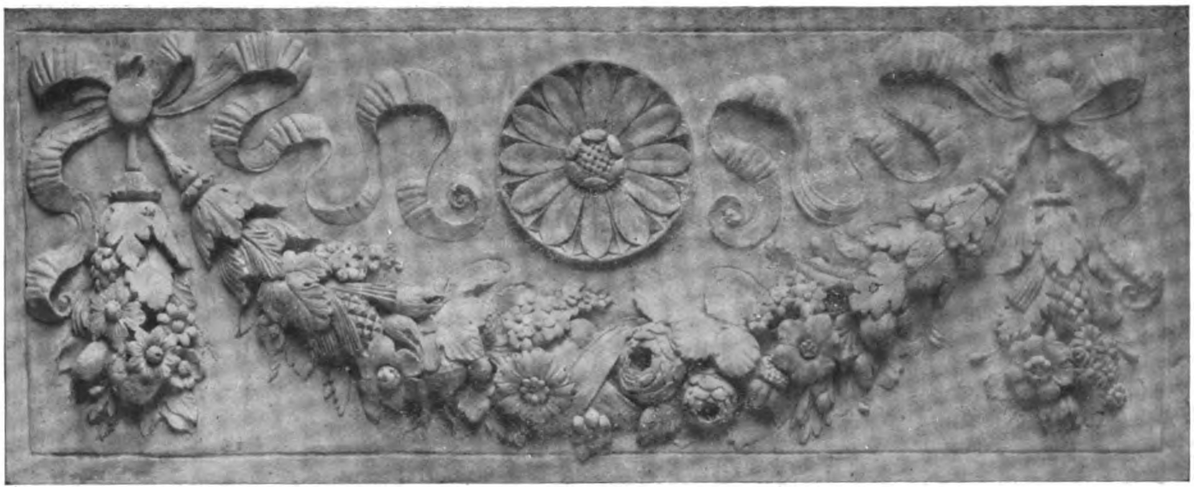

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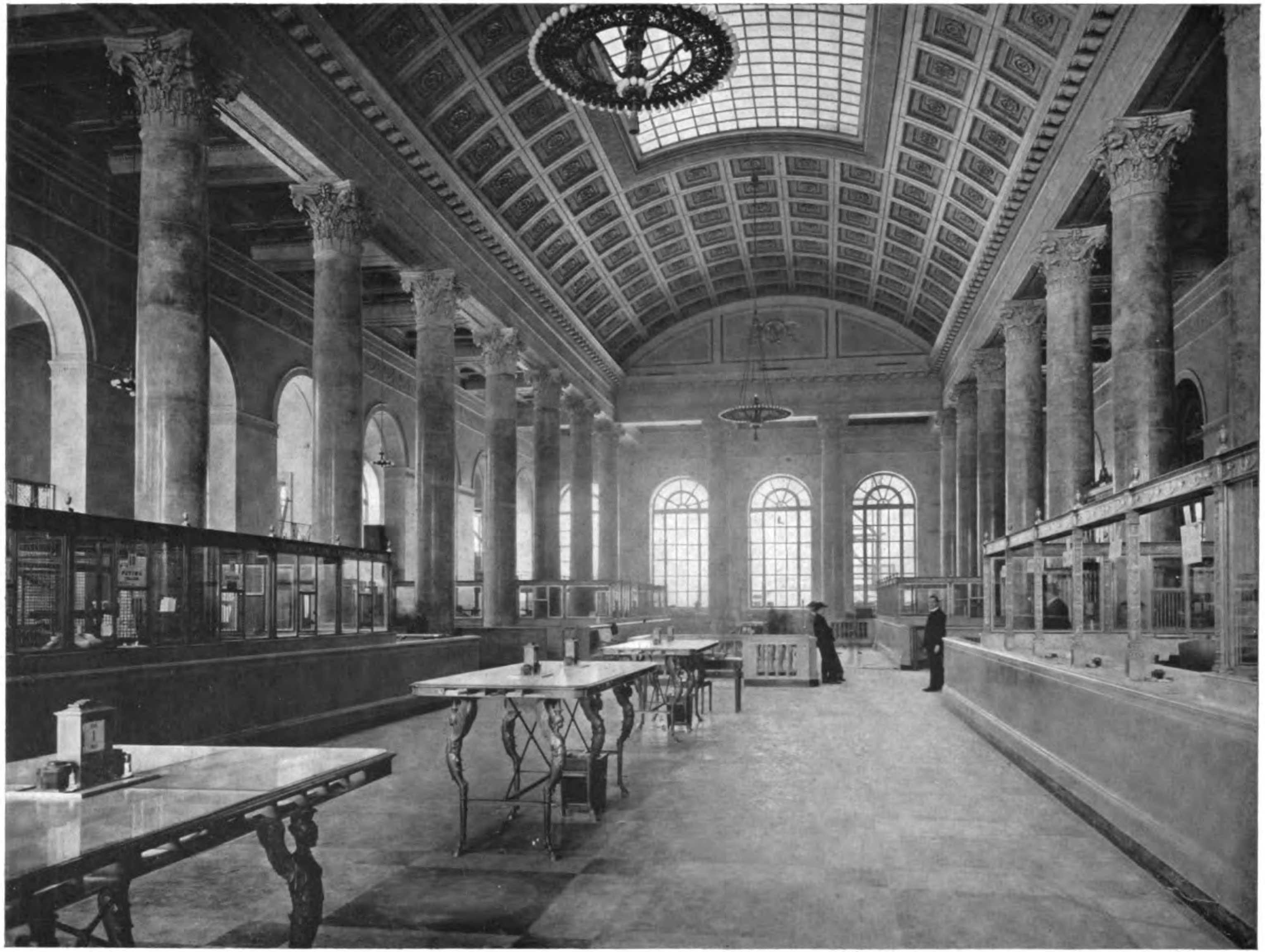

MAIN BANKING ROOM, RHODE ISLAND HOSPITAL TRUST CO., PROVIDENCE, R. I.

York & Sawyer, Architects.
Henry C. Meyer, Jr., and Bassett Jones, Associate Consulting Engineers for the Heating, Ventilating and Electrical Work.

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ARCHITECTURE AND BUILDING

A Magazine Devoted to Contemporary Architectural Construction

WILLIAM P. COMSTOCK
Managing Editor

Volume LII MAY, 1920 **Number 5**

HOW SLIDERTOWN WAS CHANGED INTO SOUTH PARK.

The first factory of the National Cash Register Company was located near the center of Dayton, Ohio. The site where the present factory stands was once a farm belonging to the president of the company. It was here he received his early training and learned the value of work.

The factory is located in that part of the city known as Slidertown and it was generally said that everything bad in Dayton slid down to Slidertown. The people lived in old tumbled-down shacks, no effort was made to keep things clean, and a very deplorable condition existed. There was a pesthouse and two graveyards near the factory. The fairground sheds were just across the street. They harbored thieves, gamblers and even worse.

The conditions were so bad it was difficult to get the class of help needed in the factory. Skilled mechanics could not be induced to come to Slidertown to live or to work.

The boys in the neighborhood had nothing to occupy their minds, and as was only natural they got into mischief. They threw stones through the factory windows, and did all sorts of damage to the plant. The company erected a high board fence around the factory to keep these youngsters out. This did very little good, because the boys broke the fence first and the windows afterwards, so we were really worse off than before.

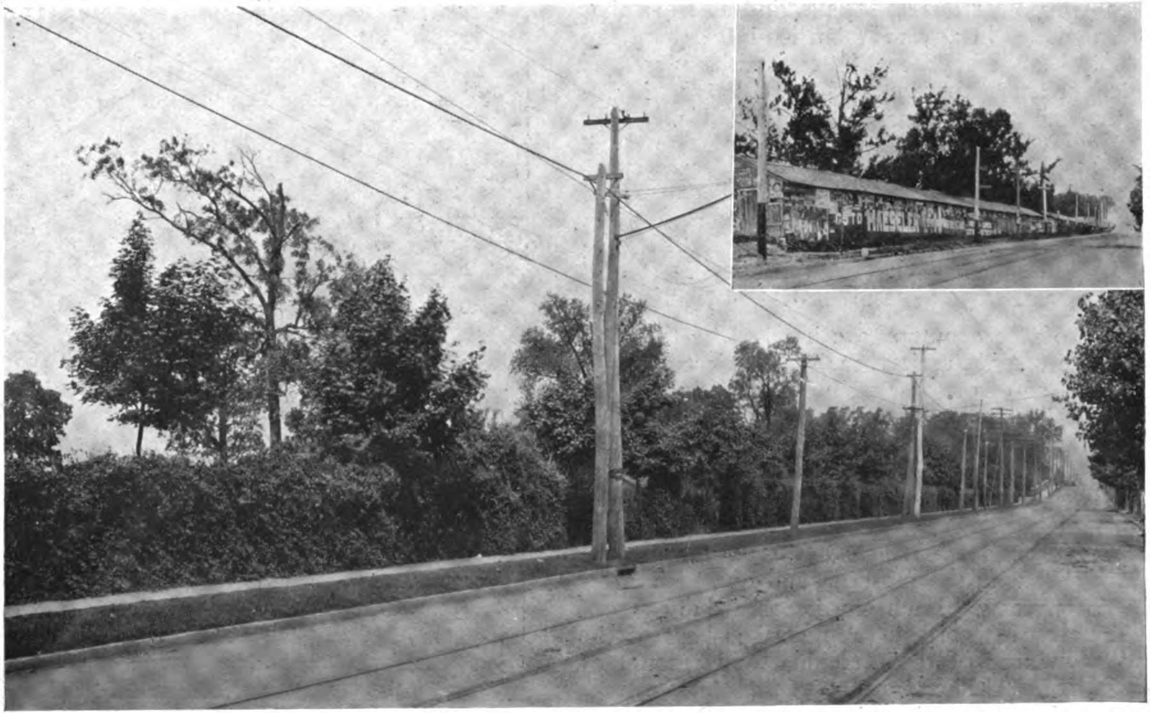
The company finally decided the best thing to do would be to set a good example for the neighborhood. It cleaned up its own premises. The unsightly fence was removed, grass seed sown, and the buildings painted. The following season flowers and shrubs were planted. The effect, however, was not particularly good, because there was no plan used in planting. The beds were simply scattered all over the lawn.

The company realized that if this was worth doing at all it was worth doing right, so we secured the services of Mr. J. C. Olmstead, a prominent landscape architect, and he taught us three simple principles of landscape gardening:

(a) Open spaces
(b) Planting in masses
(c) Avoidance of straight lines

You will find nature carrying out these principles in all of her landscapes.

But we still had trouble with the boys; they pulled up the flowers and shrubs as rapidly as we planted them. The first thought was to have the boys arrested, but it was finally decided to give them something to do instead, to occupy their minds and keep them off the street. A small house near the factory was set aside and fitted up as a house of usefulness. The boys were invited to pay the company a visit, and of course, at first they were very suspicious. We finally got them into the house and through the efforts of Mrs. Harvey, a very prominent settlement worker, secured their interest by starting classes in wood carving, clay modeling and drawing. These proved so successful that a kindergarten was started for the little tots, and classes in sewing and cooking for the girls.



UNSIGHTLY SHEDS NEAR THE FACTORY AND THE SAME SCENE A FEW YEARS LATER.

Later on, we started some egg shell gardens. An egg shell garden is simply a lot of egg shells filled with earth and seeds planted in them. We found that the children took a great deal of interest in these little gardens because they realized that the plants were growing through their efforts. In fact, it wasn't long until they wanted bigger things to do.

THE BOYS AT WORK IN THEIR GARDENS, WITH FACTORY IN THE BACKGROUND.

Near the factory was a plot of ground which at that time was not being used. It was cleared off and prepared for gardens. The boys were invited in, furnished with seed and tools, and put to work raising vegetables. The interesting thing was, that the ringleaders of the gang of boys who used to cause so much trouble were placed in charge of the work in the gardens, and it was found that they led as well for the good as they had for the bad. You see, it is only a question of getting the boy started in the right channel.

Later on, an expert gardener was engaged to encourage and instruct the boys. Our task was only to furnish the seeds and tools, the boys did all the work.

The company feels that this is one of the most practical things it has ever done. It is a kind of work that may be carried out in any neighborhood for there are always plenty of idle boys, and in most cities plenty of vacant lots. It keeps them out of the dangers of idleness and the evil associations of the street life.

The boy gardeners have been organized into a stock company which is incorporated under the State laws of Ohio. The greater part of the produce raised by the boys is taken home, which is quite a help to their parents. They sell the remainder, bank the money and at the close of the season declare cash dividends. You can see they are thus getting a good business training as the affairs of the company are handled by the boys with very little outside assistance. They elect the officers and board of directors, and hold a meeting of the stockholders daily, during the garden season to transact whatever business comes before them, and get instructions from the gardener on what to plant, and how to plant all kinds of vegetables.

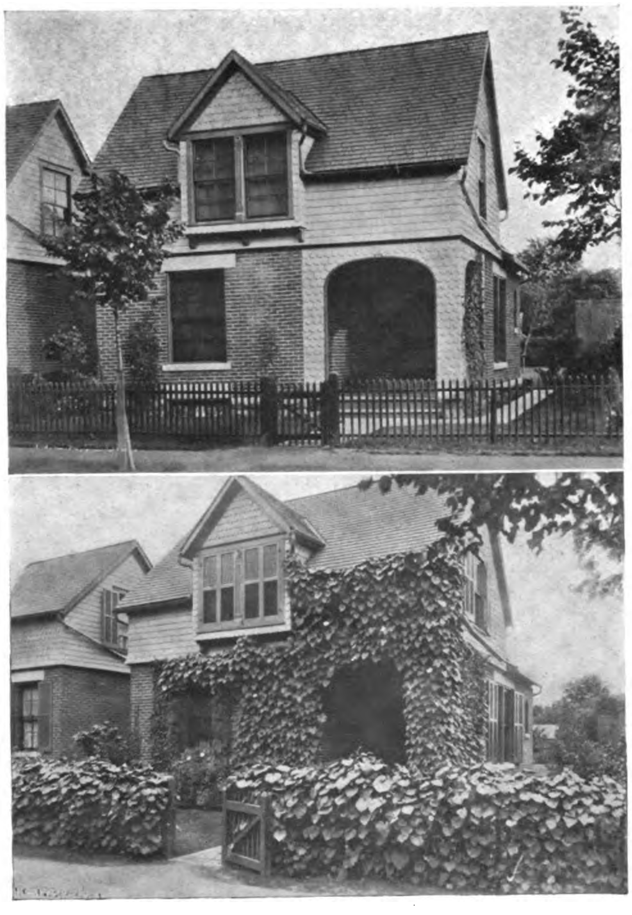
There are eighty boys working on the gardens, each boy a plot of ground 10 ft. by 50 ft. They work one hour before school in the morning and one hour after school in the evening. Each boy keeps a daily record of work done on his garden. A record is kept of the attendance, condition of tools, conduct and amount of vegetables raised. Judges are appointed to view the gardens several times during the season. Percentages are given on general appearance, condition of garden and paths, straightness of row of vegetables, etc.

At the close of the season one hundred dollars in cash prizes are given for the best results, which is an incentive for more and better work the following season.

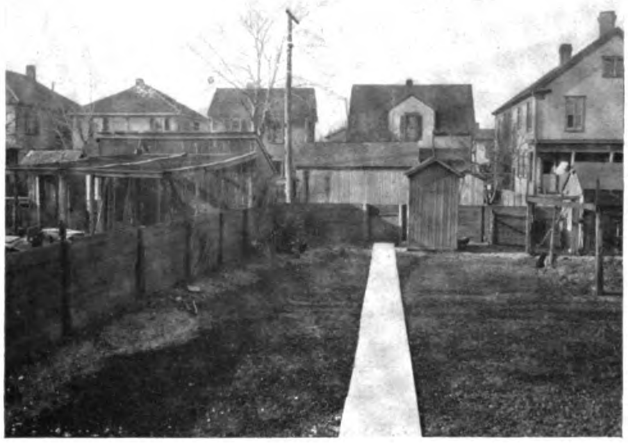
After a successful two years' course, each boy is given a diploma, which serves as an excellent recommendation should the boy apply for a position at the factory in future years. Quite a number of boys who got their start in the gardens are now working for us, and some are holding responsible positions. It is interesting to hear what they have to say in regard to the training they received there.

More than $1,700 worth of vegetables were raised by the boys last year on one and one quarter acres of ground. This shows that it is a real practical proposition.

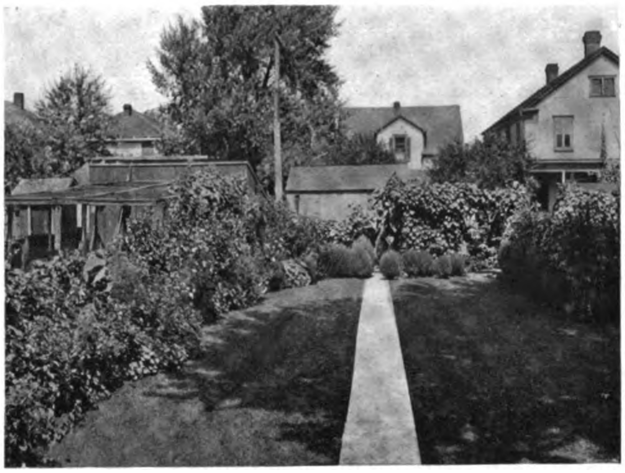
Thus we eliminated the boy problem, but the conditions in the neighborhood had not improved to any great extent. It was not so easy to influence the older people. We found, however, we were able to reach out through the boys and interest their parents in a general cleanup movement. Then in order to assist and encourage them, the company started a school in landscape gardening. Here, by the aid of pictures, we taught the right and wrong way of planting; instead of scattering the flowers all over the lawn, to use the A. B. C. principles of landscape gardening—open spaces, mass planting and the avoidance of straight lines. Then we encouraged the covering of division fences with vines when they would not remove the fences. Then we suggested window boxes and the hiding of unsightly foundations with flowers and shrubs. We showed them by means of pictures that a border of flowers for a division line was just as effective, and far more artistic, than a fence. We told them not to plant too many colors in a box; that a simple combina-



A HOME IN SOUTH PARK BEFORE PLANTING FLOWERS AND VINES AND THE SAME HOME A FEW MONTHS LATER.



A BACKYARD NEAR THE FACTORY BEFORE IT WAS IMPROVED.



THE SAME YARD AFTER THE OWNER PUT HEART INTO HIS SURROUNDINGS. THE TRANSFORMATION COST BUT A FEW CENTS AND A LITTLE TIME.

tion of colors would be more effective and beautiful. Then we showed them that this same idea could be carried out on the porch—to add a porch box or two and train up some flowering vines over the open spaces. We suggested that they use such vines as Wisteria, Honeysuckle, Clematis, Cypress, Ramblers or Moon Vines.

It wasn't long until conditions began to change; even at the small cost of ten cents the appearance of several homes was improved considerably. Some went farther and beautified their back yards at a small cost. One boy twelve years of age brought about a remarkable change in his father's back yard.

Then, in order to further encourage the neighborhood people, the company offered cash prizes from time to time for the best kept yards and lawns. Then the people began to organize improvement associations and some excellent results have been attained. By securing the co-operation of all the people on a street, it is possible to have the unsightly fences removed and a beautiful park made of a street front.

Four years ago we started the girls' gardens, not for the same reason the boys' gardens were, but simply to get the girls out into the open air and sunshine. Incidentally, they were given a good physical and mental training. Forty girls each have a small garden.

Through the courtesy of the St. Mary's College, a plot of ground has been turned over to the men in the neighborhood, and 125 men raised enough vegetables to supply their homes during the summer months.

Now as a result of all this teaching and improvement work Slidertown has been transformed into South Park; in other words, South Park has emerged from the slime of Slidertown. The people are now raising good citizens instead of hoodlums. The unsightly conditions have disappeared, the old shacks have given away to beautiful homes and, addition to all these things, real estate values have increased over 800 per cent. These things pay from a dollar and cents point of view as well as one of beauty.

ANOTHER BEAUTY SPOT. ONE OF THE PRIZE-WINNING BACKYARDS IN SOUTH PARK.

THE RHODE ISLAND HOSPITAL TRUST CO.

The Rhode Island Hospital Trust Company has finally completed its new banking quarters in Providence, R. I., begun in 1916. Only a portion of the building could be framed before the war restrictions on steel went into effect, thus only one wing of the structure was finished by January, 1919, and the other side of the structure was begun about the same time. The entire building is now completed and occupied and it is one of the most imposing structures in Providence.

The building covers an area of 24,239 square feet, the lot having about 185 feet frontage on Washington Row and a depth of about 135 feet on the side streets. Above the banking room of the ground story there is a deep light court which divides the two wings of the building. The wings are about 60 feet wide and the court slightly wider. Thus the gross floor area of the upper stories is reduced to 18,130 square feet. The net area for rental as offices is 13,660 square feet on each floor and the total rentable area on the nine floors, third to eleventh, inclusive, is 123,040 square feet. The first story used as the banking room is 49 feet in height and the ten upper stories are 12 feet 6 inches each, making the total height for the eleven stories 174 feet. The exterior of the building is of Indiana limestone throughout.

The banking room is an imposing interior following Italian Renaissance motifs in design. It is about 182 feet long and 98 feet wide, with a height of 49 feet to the central skylight.

Fourteen Corinthian columns enclose the central area used as public space and give great dignity to the proportions of the interior. The coloring of the interior is soft and pleasing with an emphasis in the rich decoration of the ceiling. The general color effect of the marble work is buff with which the bronze grille work contrasts. Green, blue and violet shades are used in the coffers of the ceiling with antiqued gold moldings in contrast. The large arched windows provide ample daylight illumination and the artificial lighting is effected by two large central fixtures and side wall brackets. Local direct lighting is provided at all desks and counters.

The public area contains 5,000 square feet of floor space, surrounded by the counter screen enclosing the bank working space. At one end of the room are the receiving and paying tellers' cages and space for the savings' department with ample desk space for the bank executives. At the opposite end are officers' rooms and space for the trust, discount and real estate departments.

The two entrances to the banking rooms are on the central axis, one from the main entrance on Washington Row, the other into the public arcade at the rear of the building giving inside communication to the upper stories. This arcade opens at either end through public entrances to Westminster Street on one side and Exchange Place on the other.

There are nine elevators connecting the arcade with the upper stories, eight passenger and one freight. Another private elevator is provided for the bank reaching the directors' room and private offices in the second story. The elevators are of the geared traction type with a speed of 450 feet per minute, and are provided with full interlocking safety devices.

The vault, manufactured by the York Safe & Lock Company, is located in the basement and built separate and apart from the construction of the building. It rests upon its own heavy foundation, and on lateral piers so placed as to provide wide spaces through which, by means of inclined mirrors and an electric lighting system located below the floor line, the entire bottom of the vault can be seen through 54 feet long observation tunnels. The vault is open to complete observation on its six sides.

The interior dimensions of the vault are 45 feet 10 inches in width by 21 feet 1 inch in depth and 9 feet 5 inches in height. The walls are constructed of an inner lining 3½ inches in thickness built up of sections of five-ply welded steel and a cast copper and iron layer; all arranged to provide the greatest resistance against shock, steel-cutting tools, and the oxyacetylene cutter-burner. Interlocking members and over-lapping sections make the vault walls as nearly as possible a solid mass.

This lining is surrounded on all sides with concrete walls poured directly against the lining, the composition of the concrete containing elements affording the greatest resistance. The walls are reinforced with double rows of heavy, standard steel railroad rails, and the top is further reinforced with 20-inch I beams to furnish resistance to falling building walls.

There are two entrances to the vault guarded by doors two and one-half feet thick, each weighing 25 tons and fitting into 22-ton frames.

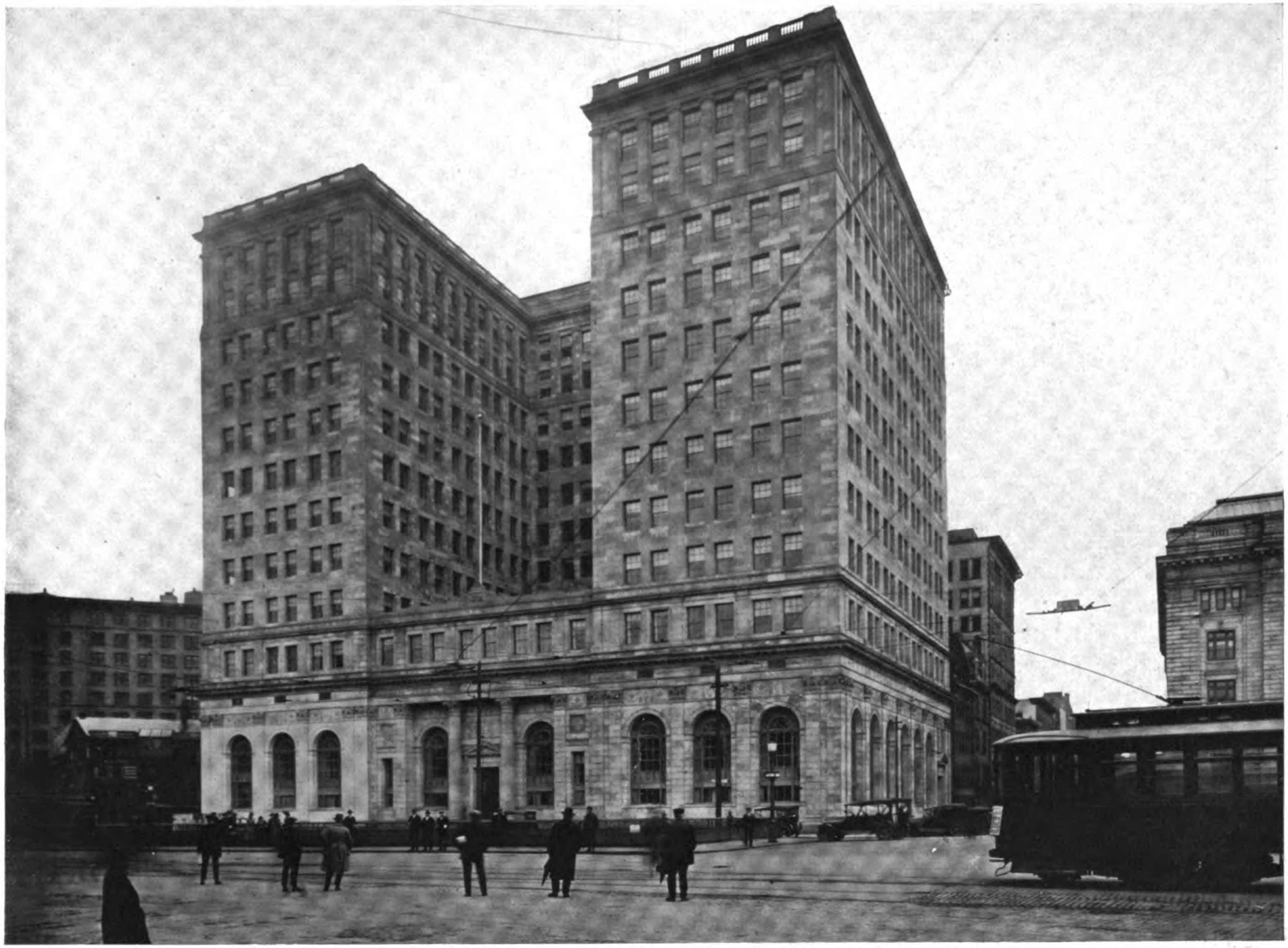
The electric protection system thoroughly covers all of the six sides of the vault, and it is so arranged as to give instant warning at the central office of the Rhode Island Electric Protective Company.

The vault is designed to hold more than 10,000 safe deposit boxes, of which number more than 4,000 have been installed. It is finished in polished steel panel work and has a Tennessee marble-mosaic floor. The illumination is secured by electricity, the circuits being operated by automatic switches under lock and key to prevent any possibility of the vault being thrown into darkness for the purpose of robbery. There is a secondary lighting system which operates automatically should any accident happen to the principal one. Furthermore, there is a storage battery upon which reliance can be placed should the other systems fall down. Should, by accident, one of the clerks be locked in the vault at the time it is closed, he can push a button release the dogging mechanism of the time locks and telephone to the officers of the bank, who would operate the combination locks and effect his release, after which the time-lock devices would be reset and the doors locked. Frederick S. Holmes was the vault engineer.

For the convenience of the holders of safe deposit boxes there are 45 coupon rooms, while in the trunk storage department there are four such rooms. The trunk storage department has two rooms, one 15 by 32 and the other 13 by 22 feet.

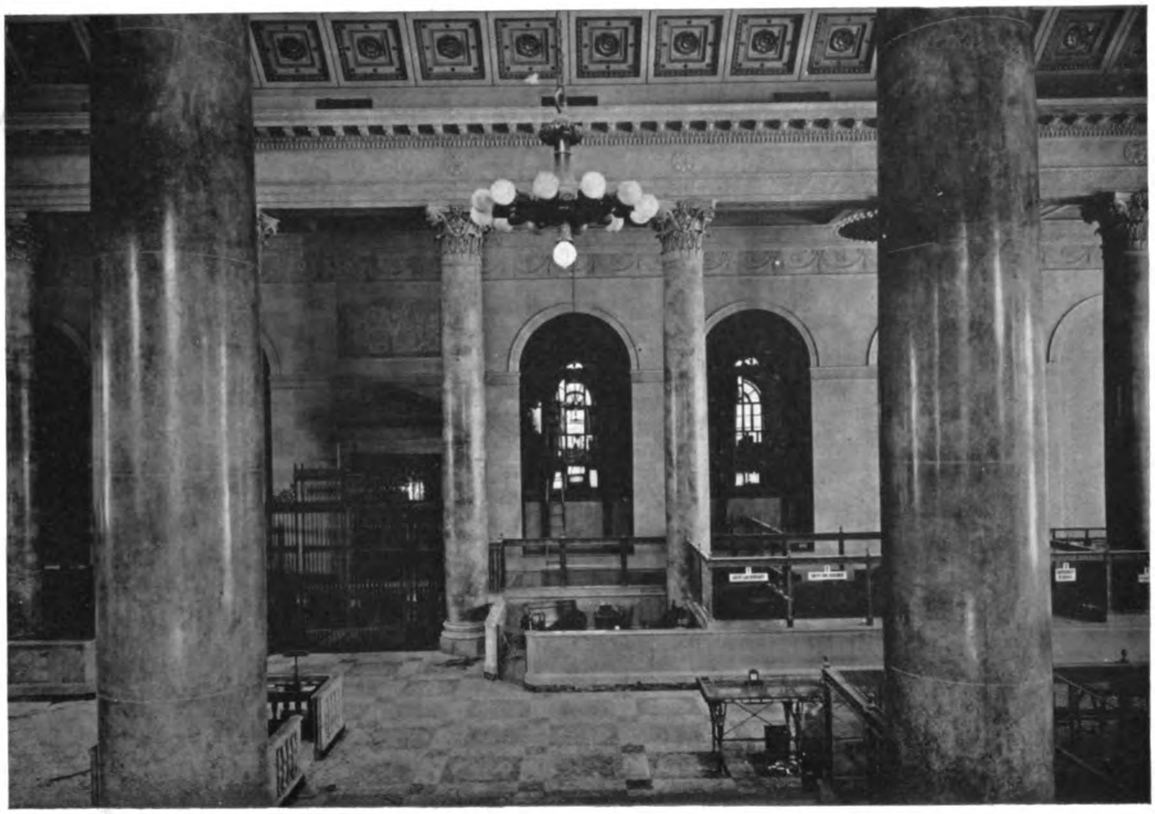
The basement also contains rest rooms and toilet facilities for bank employes and space for the heating plant. This consists of three boilers fired with oil fuel. The mechanical plant consists of the house and fire pumps for the stand pipe supply and the ventilating system with air washing and humidifying equipment.

The architects of this bank building were York and Sawyer and the general contractors were the George A. Fuller Company. Henry C. Meyer and Bassett Jones were associated consulting engineers for the heating, ventilating and electrical work. The decorating was executed by Elmer E. Garnsey, all the bronze work

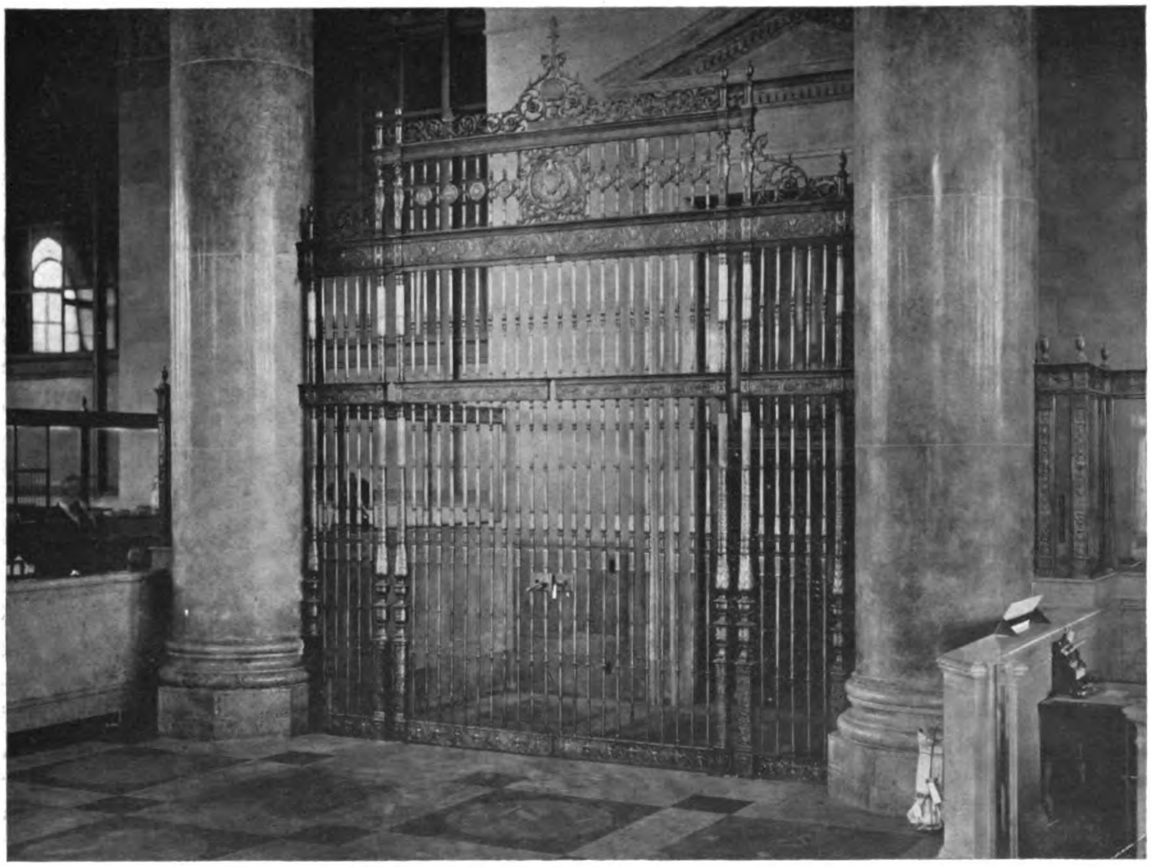


RHODE ISLAND HOSPITAL TRUST CO., PROVIDENCE, R. I.
York & Sawyer, Architects.

Built by George A. Fuller Co.; cement — Knickerbocker **Portland Cement Co.;** elevators—A. B. See Electric Elevator Co.; bronze and kalamein doors—Reliance Fireproof Door Co.; miscellaneous iron work—C. E. Halback & Co.; boilers—Titusville Iron Works Co.



MAIN BANKING ROOM FROM MEZZANINE FLOOR

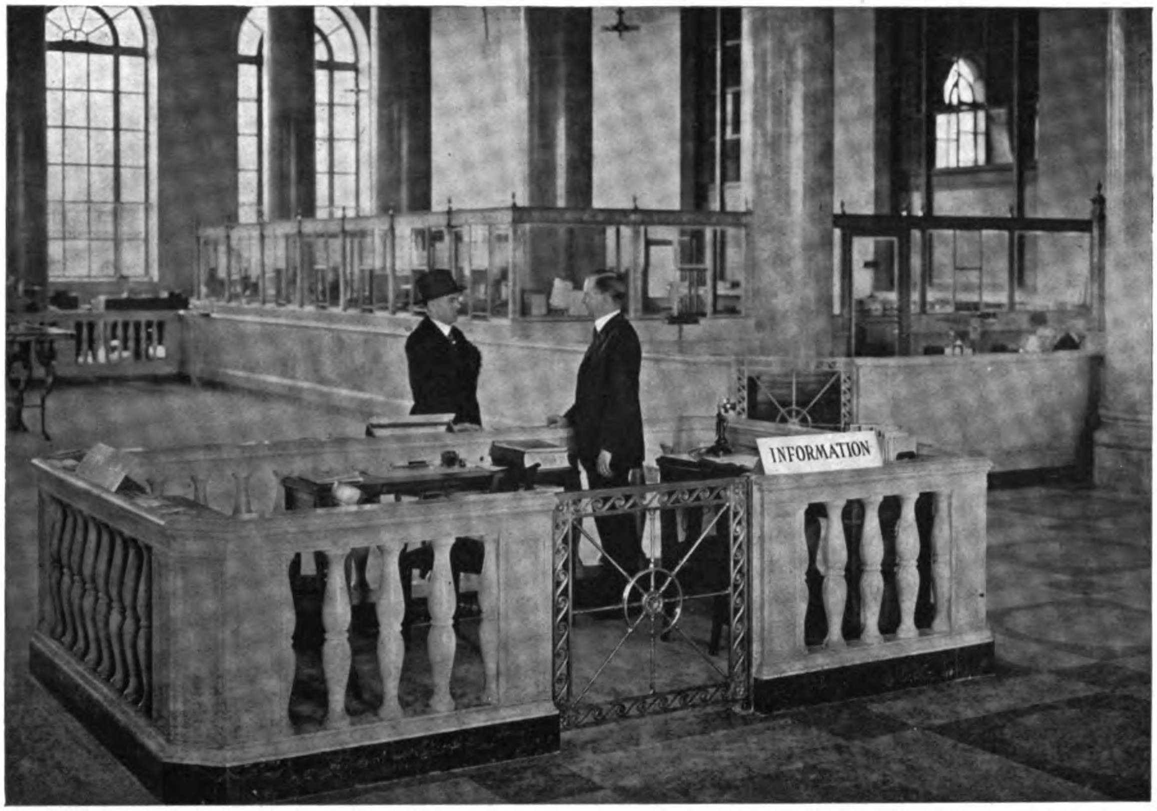


ENTRANCE GATES TO MAIN BANKING ROOM
RHODE ISLAND HOSPITAL TRUST CO., PROVIDENCE, R. I.

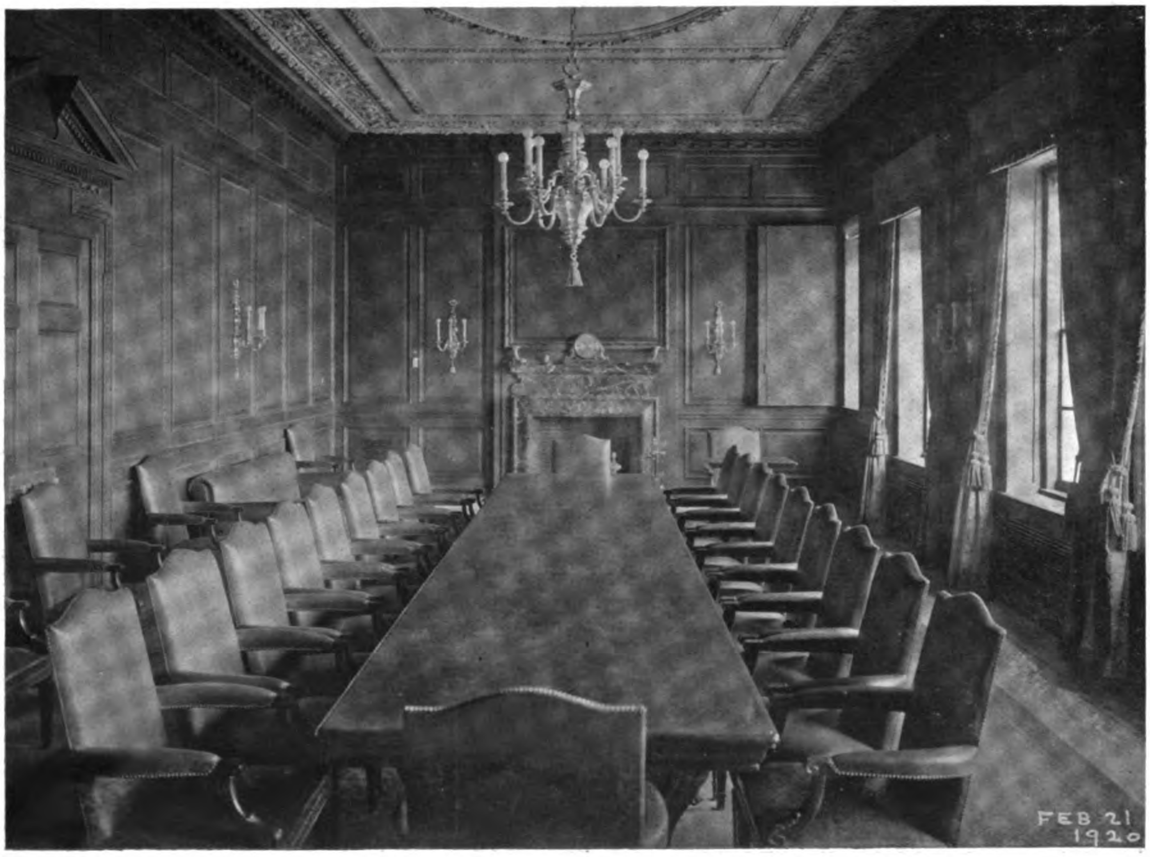
York & Sawyer, Architects.

ARCHITECTURE AND BUILDING. Plate 52.

Henry C. Meyer, Jr., and Bassett Jones, Associate Consulting Engineers for the Heating, Ventilating and Electrical Work.
Built by George A. Fuller Co.; bronze work—The Gorham Co.; directory boards—U. S. Changeable Sign Co.; mail chutes—Cutler Mail Chute Co.



INFORMATION BOOTH IN CENTRE OF BANKING ROOM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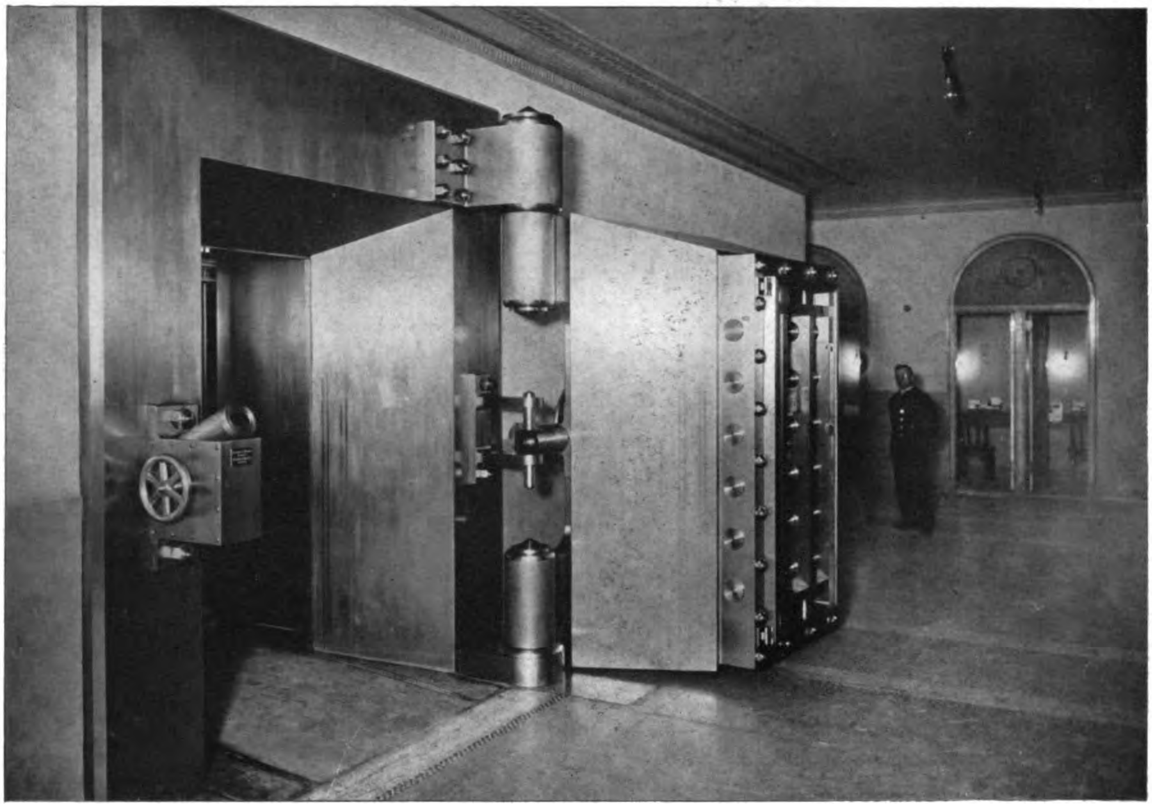
DIRECTORS' ROOM, RHODE ISLAND HOSPITAL TRUST CO., PROVIDENCE, R. I.

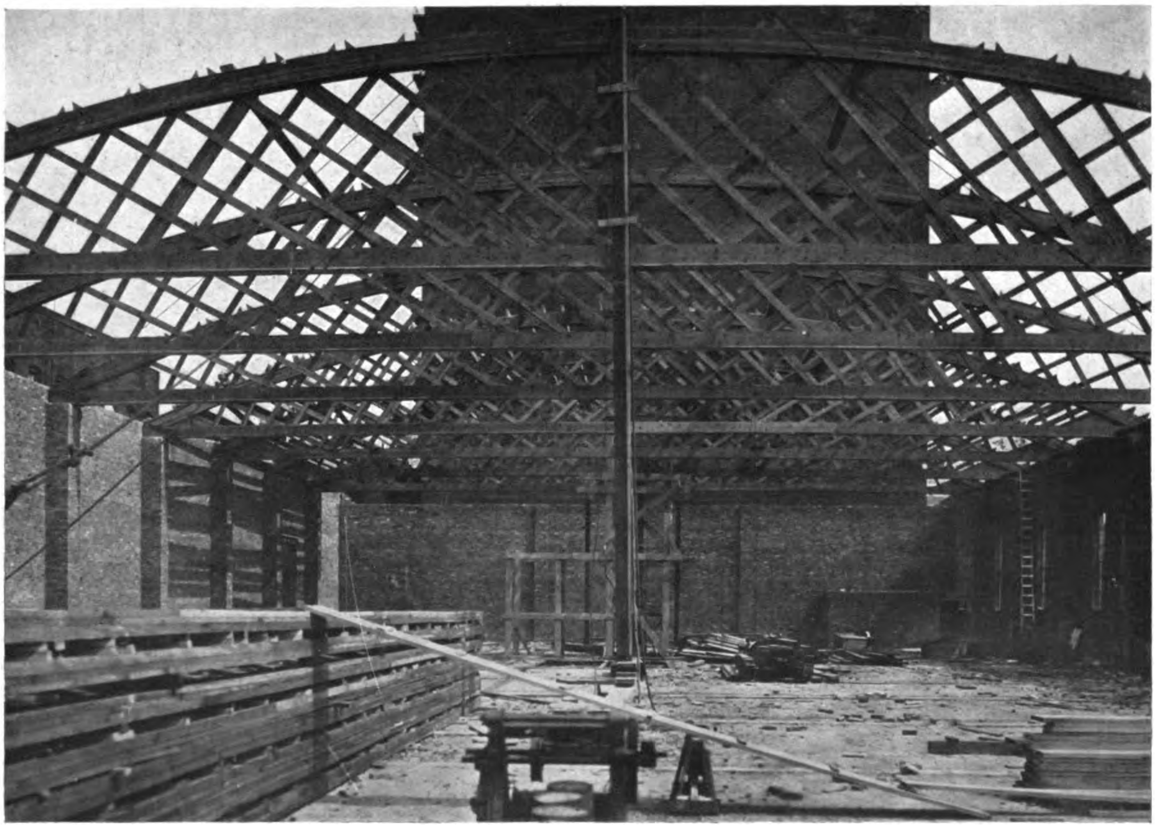
York & Sawyer, Architects.

ARCHITECTURE AND BUILDING. Plate 53.

Bronze work—The Gorham Co.; ornamental and plain plastering—T. A. O'Rourke, Inc.; window shades—Callender, McAuslan & Troup Co.

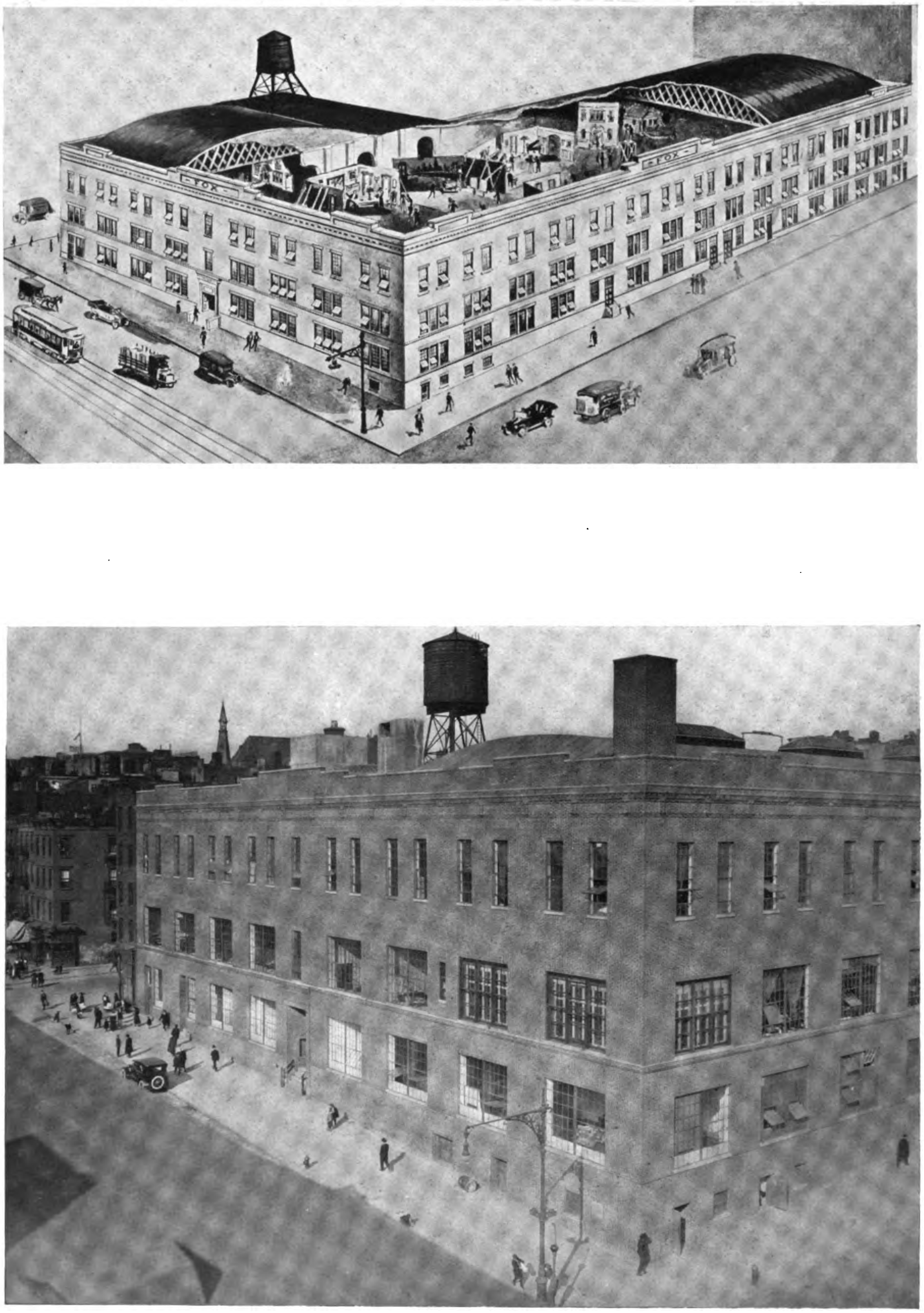


SAFE DEPOSIT VAULT, RHODE ISLAND HOSPITAL TRUST CO.,
Vault engineer—Frederick S. Holmes; vaults supplied by York Safe & Lock Co.



STRUCTURAL VIEW OF FOX FILM CORPORATION BUILDING, TENTH AVENUE AND 55th STREET, NEW YORK CITY.
William Fried, Architect.

Lattis-Trusses for roof—McKeown Bros. Co.; sprinkler system—Rafsler Sprinkler Co.

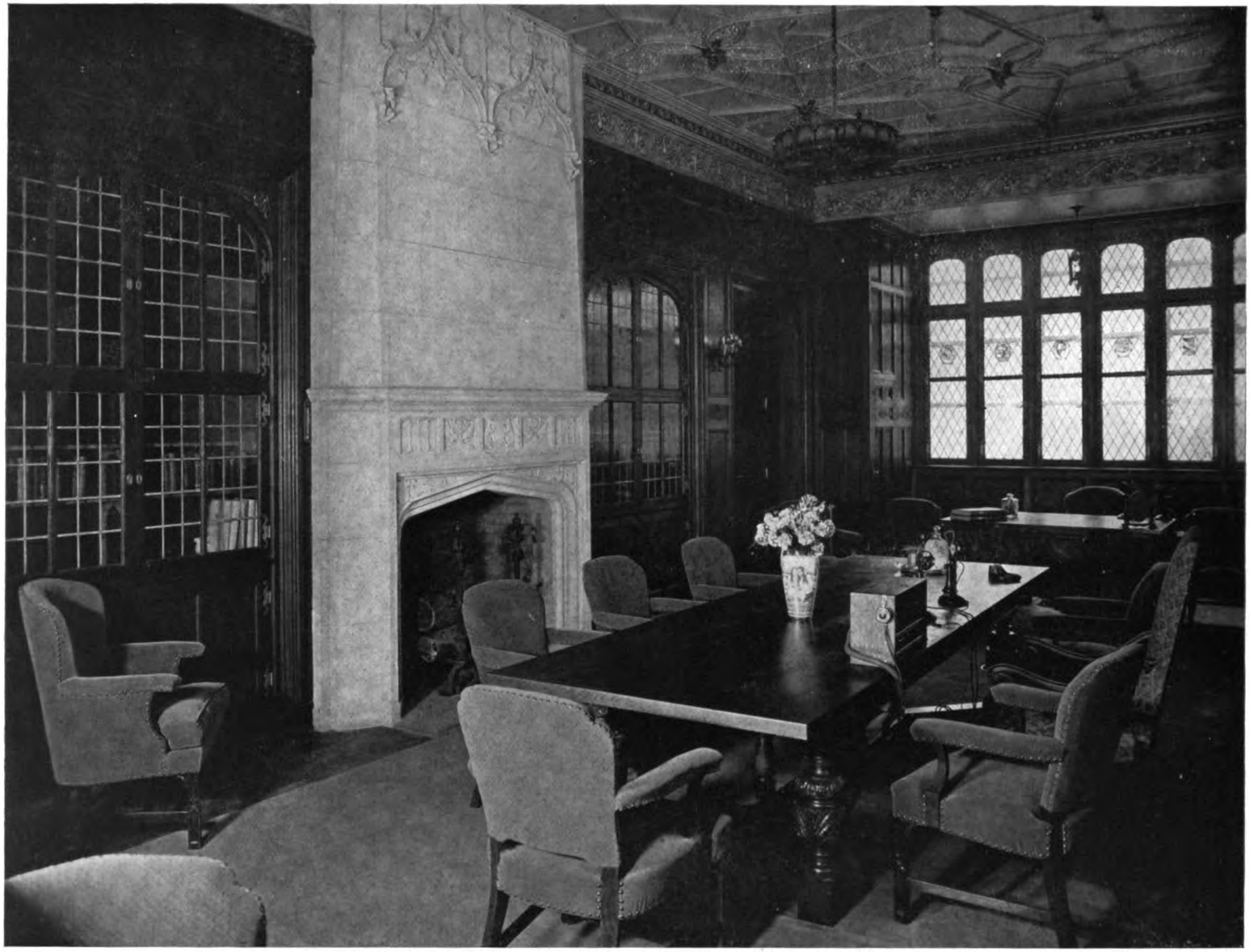


FOX FILM CORPORATION BUILDING, TENTH AVENUE AND 55th STREET, NEW YORK CITY.

William Fried, Architect.

Architecture and Building. Plate 55.

Office partitions—Acme Wood-Working Co., Inc.; plumbing—Sam Minskoff; heating and ventilating—Raisler Heating Co.; stage plugging boxes, plugs and connectors—New York Calcium Light Co.; painting—Sommer-Nestle Painting and Decorating Co.; night watch and fire-alarm service—American District Telegraph Co.; moving picture machines—Nicholas Power Co.

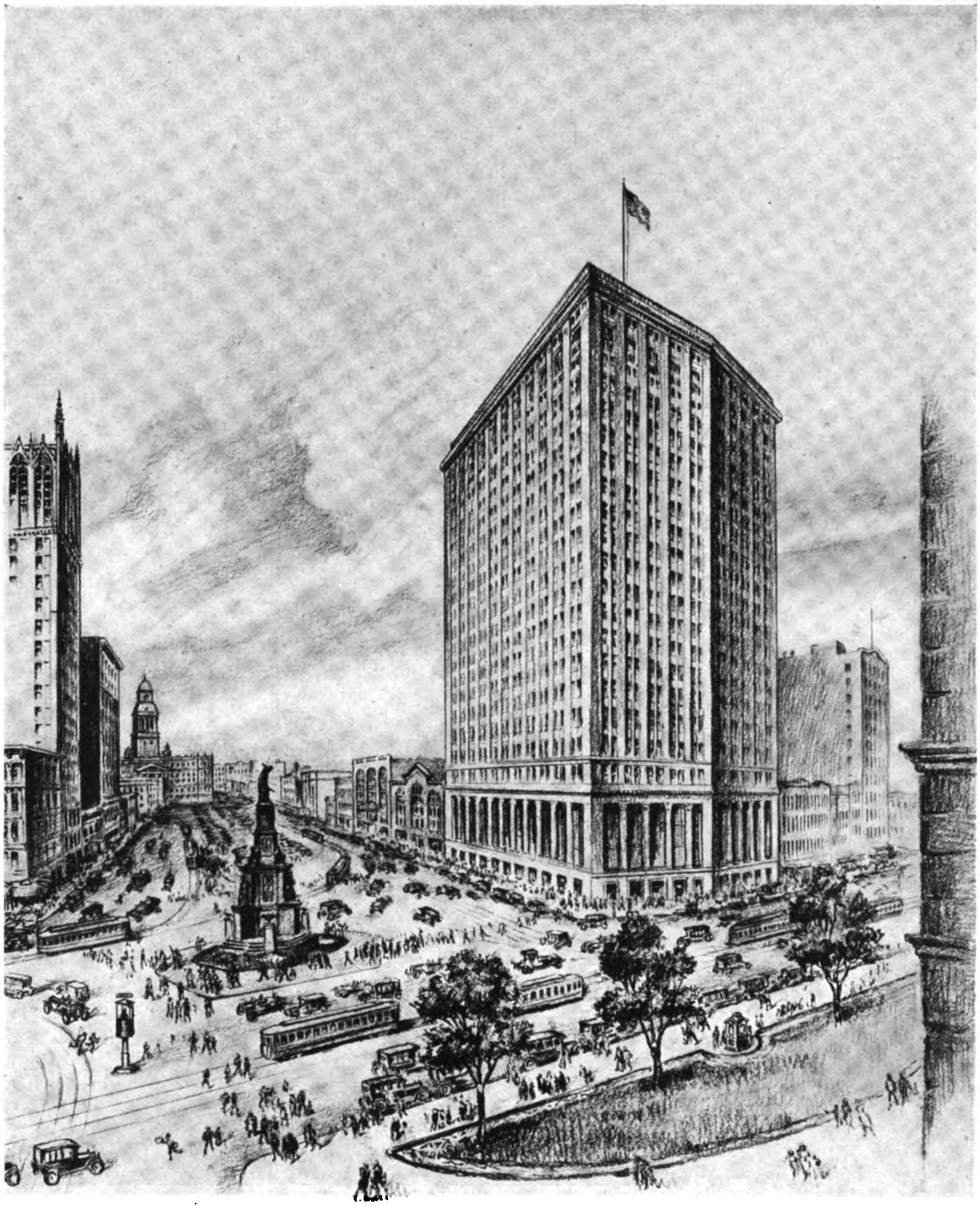


PRESIDENT'S ROOM, FOX FILM CORPORATION BUILDING, TENTH AVENUE AND 55th STREET, NEW YORK CITY.

William Fried, Architect.

ARCHITECTURE AND BUILDING. Plate 56.

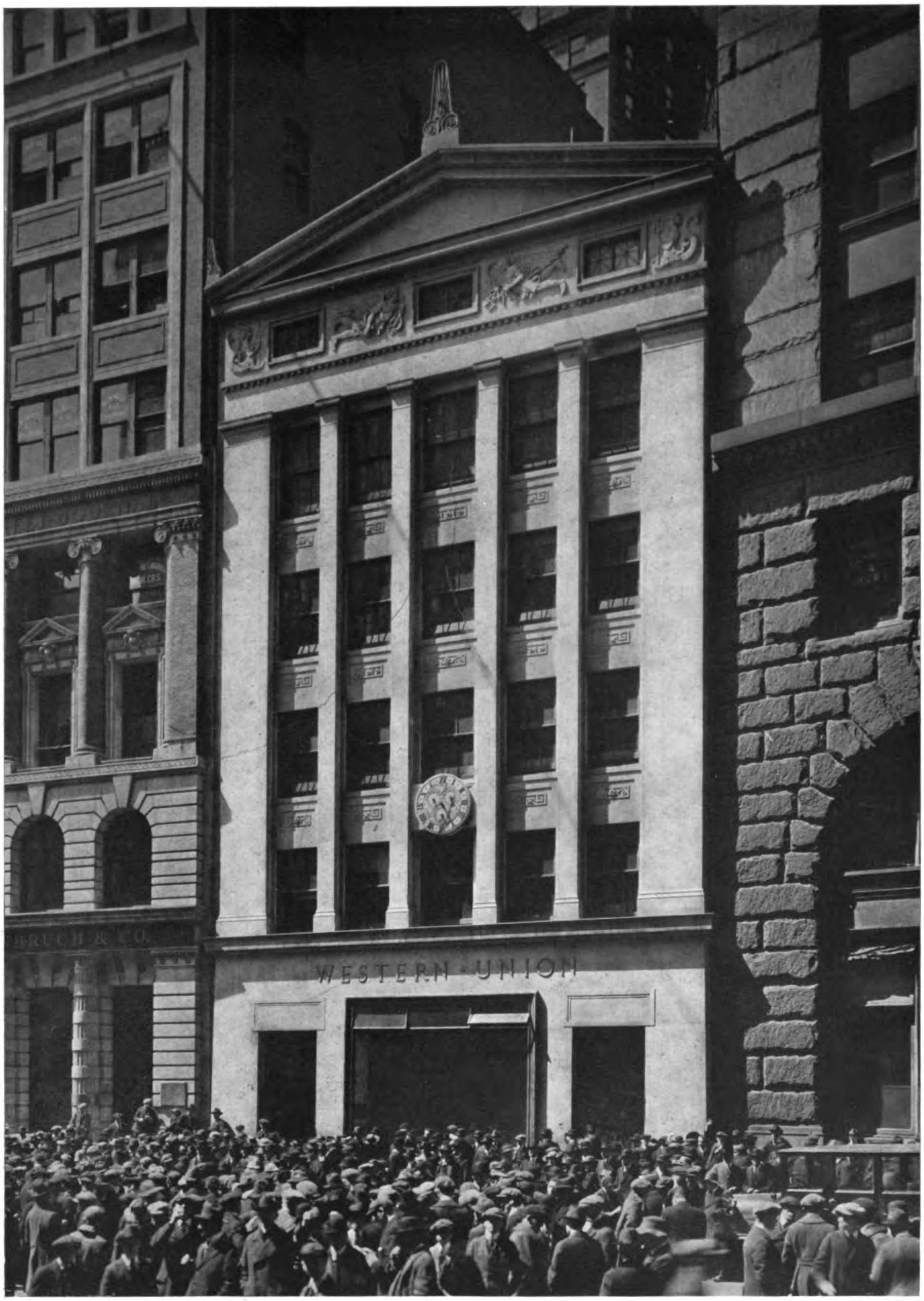
Electric contractors—E. J. Electric Installation Co.



FIRST AND OLD DETROIT NATIONAL BANK AND OFFICE BUILDING, DETROIT, MICH.

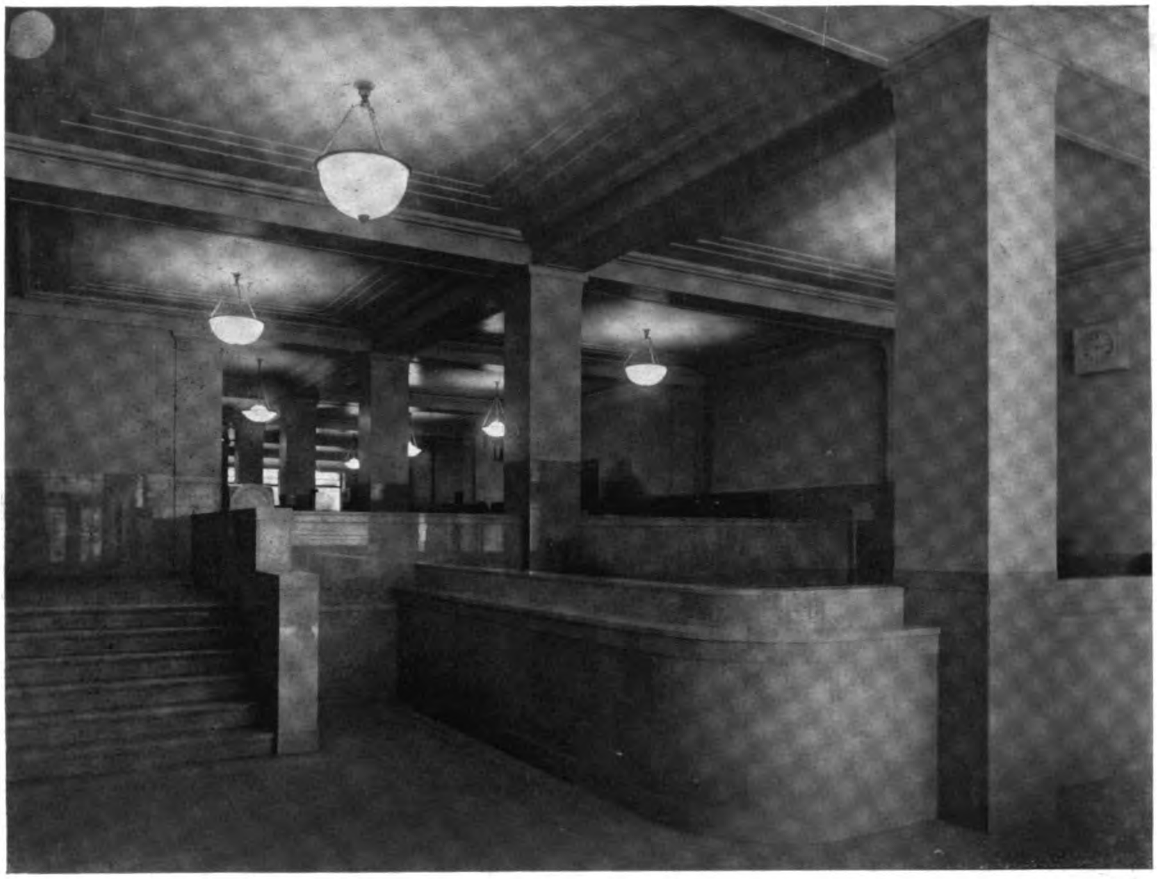
Albert Kahn, Architect.

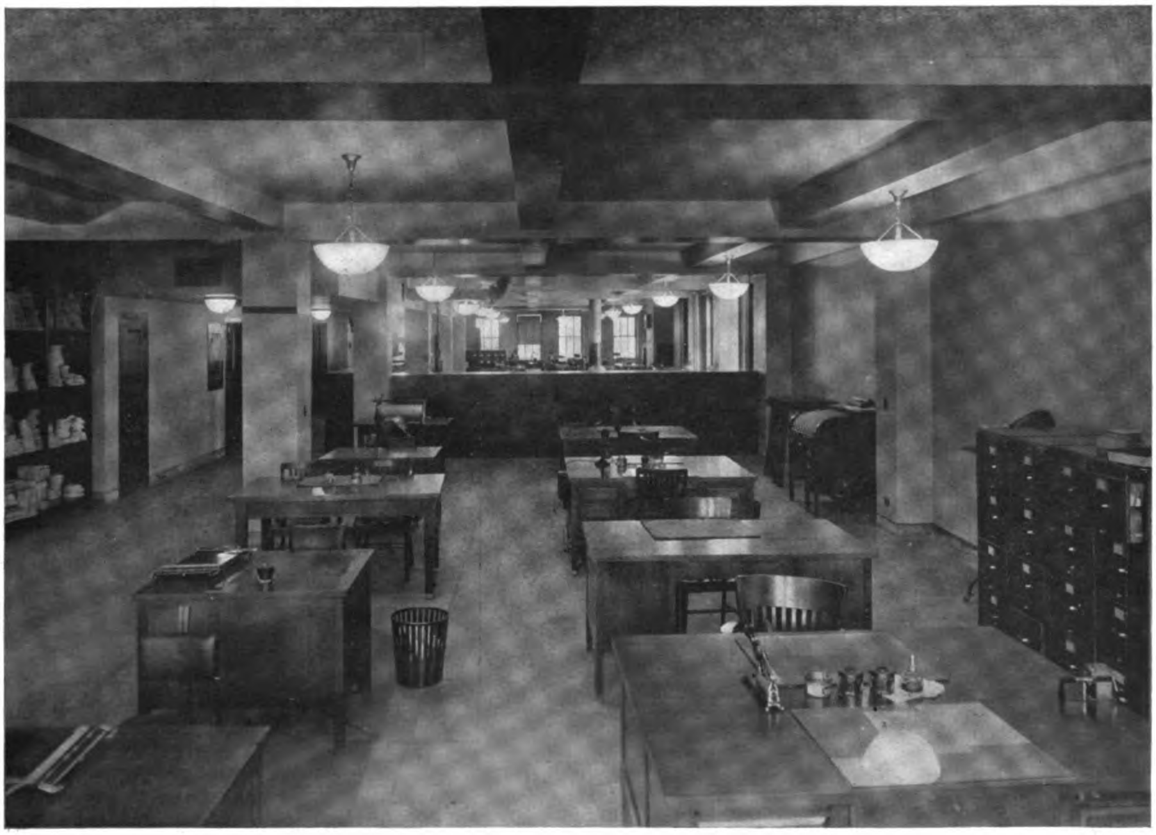
ARCHITECTURE AND BUILDING. Plate 57.
To be erected by The Foundation Co.; cut stone—Central Oolitic Stone Co.; engineering service for bank equipment and layout—Thomas Bruce Boyd, Inc.; interior finish—The Matthews Bros. Mfg. Co.; painting—The Barker Painting Co.



OCEAN CABLE BUILDING, 38-40 BROAD STREET, NEW YORK CITY.
William Welles Bosworth, Architect.

ARCHITECTURE AND BUILDING. Plate 58.
Built by Marc Eidlitz & Son; elevators—A. B. See Electric Elevator Co.; ornamental iron work—The Wells Architectural Iron Co.



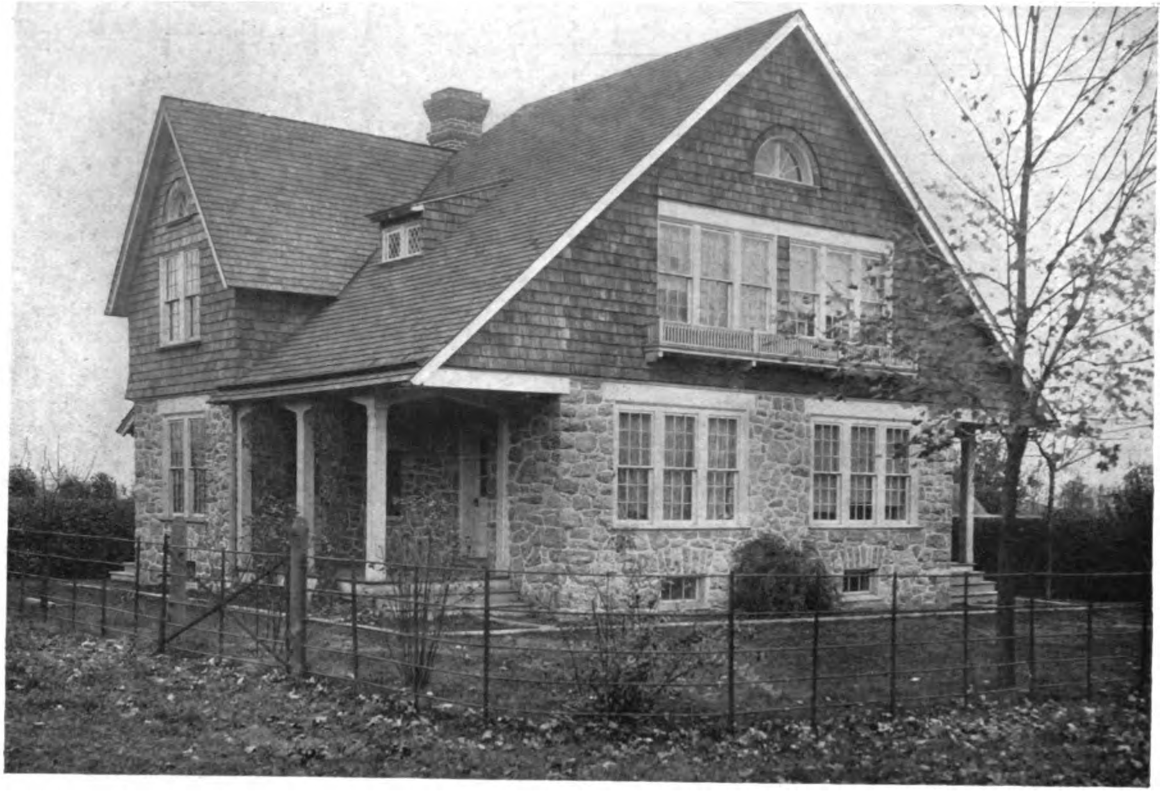


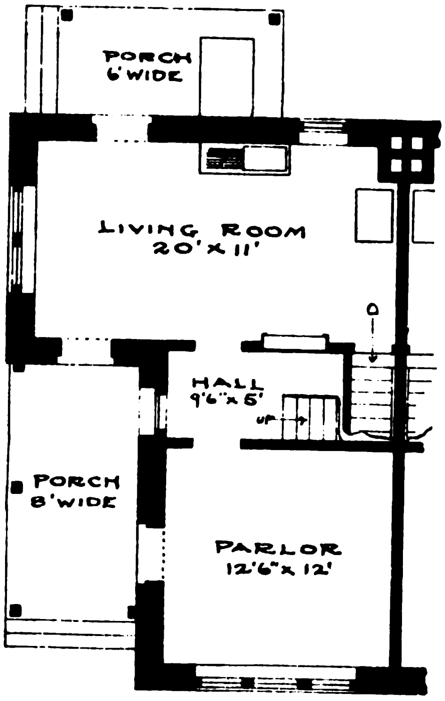
MAIN AND FOURTH FLOORS, OCEAN CABLE BUILDING, 38-40 BROAD STREET, NEW YORK CITY.

William Welles Bosworth, Architect.

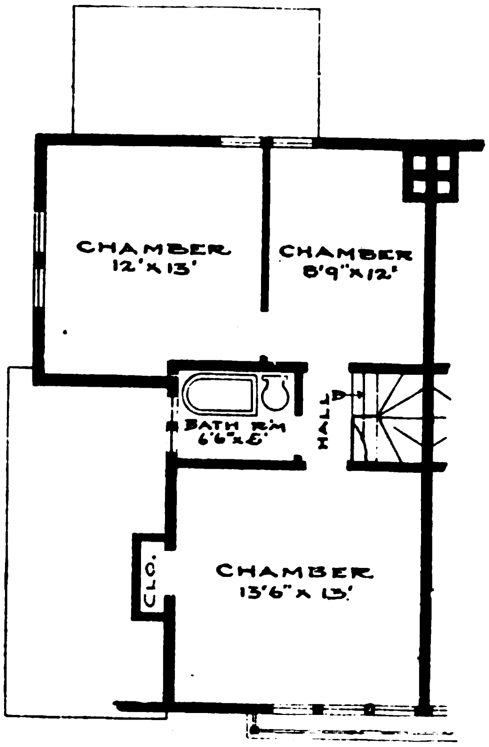
ARCHITECTURE AND BUILDING. Plate 59.

Built by Marc Eidlitz & Son; interior marble—McLaury Marble & Tile Corporation; composition floors—The Marbleloid Co.





·FIRST FLOOR·



·SECOND FLOOR·

HOUSE FOR MR. M. F. P. HAYS AT OVERBROOK, PA.
C. E. Schermerhorn, Architect.

by the Gorham Company, and the ornamental and plain plastering by T. A. O'Rourke, Inc. The window shades were supplied by Callender, McAuslan & Troup Company, and the U. S. Changeable Sign Company installed the directory boards. The Cutler Mail Chute Company installed the mail chutes. The cement was supplied by the Knickerbocker Portland Cement Company, Inc., and the bronze and kalamein doors were manufactured by the Reliance Fireproof Door Company. A. B. See Electric Elevators are installed. The miscellaneous iron work was done by C. E. Halback & Co., and the Titusville Iron Works Company supplied the boilers.

NEW OFFICE AND BANKING BUILDING IN DETROIT.

The Hotel Pontchartrain, Detroit, was not so old a structure that it would be looked upon in the ordinary community as ready for scrapping, but conditions change with great rapidity in some of our progressive cities and Detroit is noted for its progress and greatly increasing business and population.

Under modern conditions the building had become unsuitable for hotel purposes. With less than four hundred guest rooms and only one-half of them with baths, the hotel, in the opinion of experts, could not be made to pay year in and year out, even if remodeled. The hotel, therefore, was doomed.

Three banking institutions, the First and Old Detroit National Bank, the Central Savings Bank and the First National Company have purchased the Pontchartrain property because it was about the only well-located, available site large enough for their needs. The advisability of remodeling the building into banking rooms and rentable office space was considered, but when the drawings and estimates were prepared, it became evident that it would be uneconomical to attempt the change. There seemed a certainty that the result would be a make-shift, with small earning powers at best.

The area of the site is about 19,500 square feet, and the new building will be 24 stories in height, with the exterior in buff limestone.

There will be ten passenger elevators and one freight elevator, and a twelve foot wide stairway up to the main banking rooms of the First and Old Detroit National Bank.

The banks will occupy the basement, basement mezzanine, sub-basement and sub-basement mezzanine. The basement will include bank storage space, printing department, safe deposit vaults, storage vaults, late deposit vaults, coupon booths and safe deposit vault offices. The basement mezzanine will include toilet rooms and storage space for the stores in the ground story. The sub-basement mezzanine will include the bank cash vault and the sub-basement proper will contain the mechanical equipment.

The space above the ground story that will be occupied by the First and Old Detroit National Bank is as follows: The first story mezzanine will include locker and washroom for the men employes, located in the rear of the building on the alley side.

The entire second story will comprise the main bank floor of the National Bank and will be approached by stairway from the ground level, as well as by the public elevators. The ceiling height of this main banking auditorium will be thirty-six feet. There will be two mezzanines along the alley side of the main banking room; the first mezzanine, or that which will be known as the third story will house the credit department, locker and rest room for women employes, and the second mezzanine, or that which will be known as the fourth story, will house the audit department, transit department, infirmary, etc.

The rear and alley portions of the next four stories, that is, the fifth, sixth, seventh and eighth, will be occupied by the banks and the First National Company and other allied interests. The portion of these stories which will face Woodward Avenue and Cadillac Square will be divided into offices for rental.

In the fifth story will be located the bank employes' kitchen and dining room; on the sixth story will be the directors' room, private offices, committee rooms, library and officers dining room; in the seventh story will be telephone exchanges, stenographers' room, new business dpeartment and other bank working space, and in the eighth story will be the First National Company and other bank offices.

All stories above the eighth, that is, from the ninth to the twenty-fourth inclusive, will be utilized for rental office space, with about 13,000 square feet on each floor; the total area of each of these floors will be approximately 16,000 square feet.

Two elevators will be used by officers and employes of the banks, and private stairways will run throughout the banking rooms. The public stairways will be enclosed from the ground floor to the fifth floor, where they will open out into the elevator and lobby spaces.

The main floor lobby will have three entrances from Woodward Avenue and one from Cadillac Square. There will be ten stores along Cadillac Square and Woodward Avenue. The Savings Bank will occupy the rear of the first floor on Cadillac Square, with an area of approximately 10,000 square feet.

The architect for this building is Albert Kahn, and the general contract has been awarded to the Foundation Company, who will handle the erection of the complete building, including all mechanical trades. It is estimated that the completed building, including the equipment and furnishings of the banking quarters and the cost of the site, will represent an investment in excess of $8,000,000.

The interior finish for this bank will be supplied by the Matthews Bros. Mfg. Co., and the painting will be done by the Barker Painting Co. The cut stone work will be executed by the Central Oolitic Stone Co., and Thomas Bruce Boyd, Inc., has the contract for the bank equipment and layout.

THE FOX FILM BUILDING.

The film making business has not been well represented in New York City heretofore, though the film exhibitor has certainly held full sway. The manufacturing of films has recently been started on a large scale in a new building built for the Fox Film Corporation on Tenth avenue, extending from 55th to 56th streets, of which William Fried was architect. The frontage on the avenue is about 200 feet, the depth on 55th street 275 feet and on 56th street 150 feet, with two ramps occupying additional space leading from 56th street to the studio floor level. There are three stories.

The building is so divided that the making of pictures will be in one part, the clerical offices in another and the physical handling of film in the third. Each of these departments will be within easy reach of the administration offices, making the plan most compact and efficient.

Unusual precautions have been taken in the construction to insure safety. The building is of fireproof construction throughout. The walls are of brick, with a front of pressed brick, and the frame is of steel and concrete. A sprinkler system, with a 50,000 gallon roof tank and a variety of auxiliary fire fighting devices will be provided. Main reliance, however, for the safety of the employes and actors is placed on the wide ramps which run from the ground to each of the three floors of the buliding. The ramps, extending to the first and third floors, will be big enough and strong enough to permit fire engines to run directly into the building and will provide means of egress which it is claimed will allow the building to be emptied within sixty seconds after an alarm of fire. The third floor ramp may be used also in bringing large props to the studio level, and it is possible to drive automobiles directly to this floor and park them there.

The projection rooms are one of the principal features of the building and have every convenience of a small theatre. Comfortable seats are arranged on a sloping floor and each projection room has a piano and provision for other music, and the length of the rooms is such that unusual "throw" can be provided for the pictures shown.

Conveniences for the employes include a large restaurant, a gymnasium, dressing room accommodations for 1,000 persons, green rooms, a library and rest rooms in each story. There will be also a large library for manuscripts and books purchased for dramatic purposes and an experimental laboratory where a corps of experts will be kept busy constantly developing new processes and forms of developing, printing and tinting negatives

There will be a variety of shops. One of these will be for carpenters, another for artists who make plaster casts for sets, a room for scene artists, three working prop rooms, a sewing room, a drapery room, a wardrobe department, storage space for studio properties and a studio library where information regarding locations, costuming, etc., will be assembled and catalogued for the convenience of directors. Adjoining the studios proper will be twenty dark rooms for camera men, a first-aid room, adequate quarters for the technical director and his staff and rooms for draftsmen and interior decorators.

The 150,000 square feet of floor space in the building provide for the general executive offices along the entire 10th avenue front in the first two stories.

The laboratory occupies the rear portions of the first and second stories and has a capacity for turning out 3,000,000 feet of film every week.

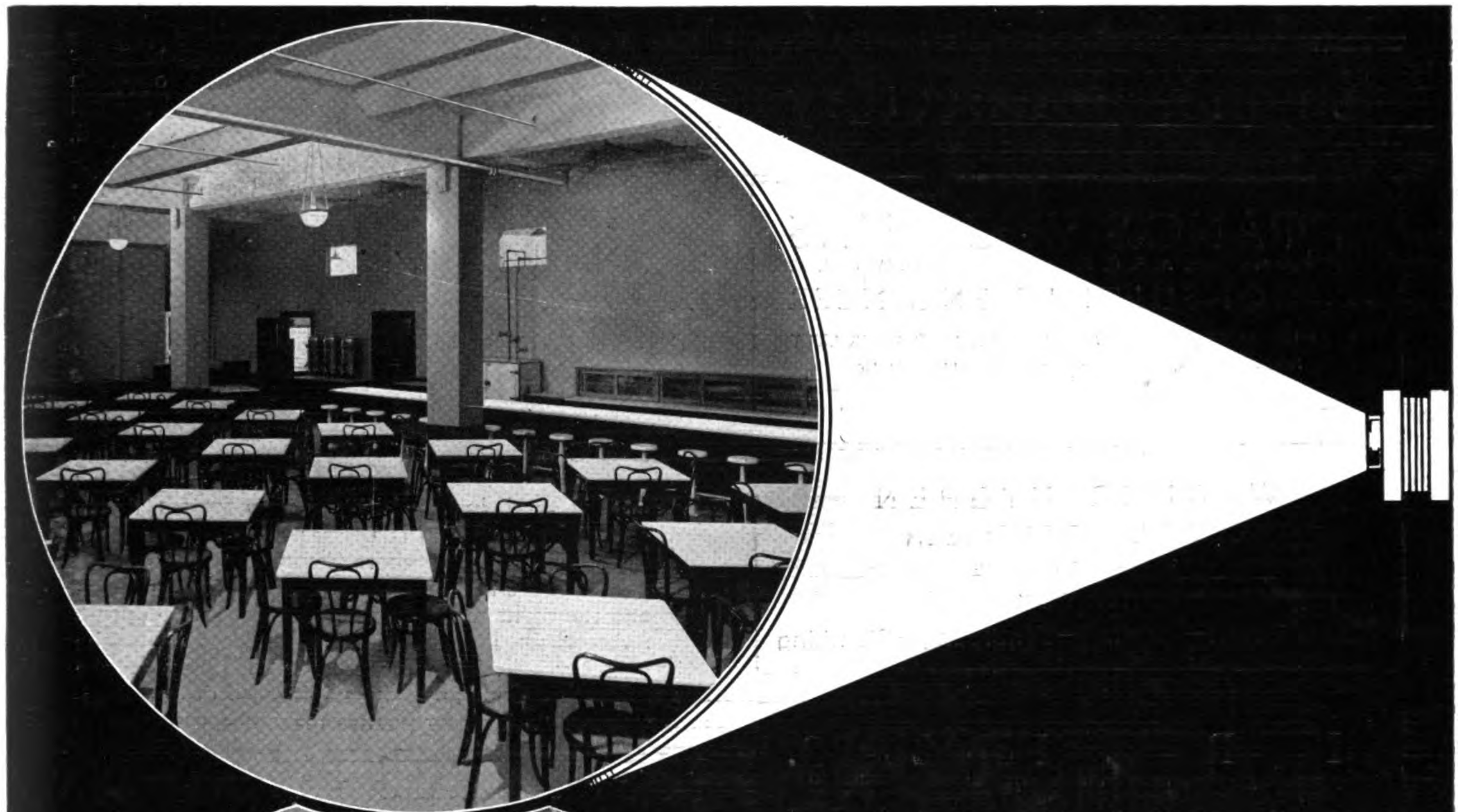
Electrically the building is divided into three sections, laboratory, administration and studio. There are four different sources of central station supply, alternating current for the laboratory and three direct current services for the lighting elsewhere. Each of these will deliver 3,000 amperes and has separate cables leading direct to the central station.

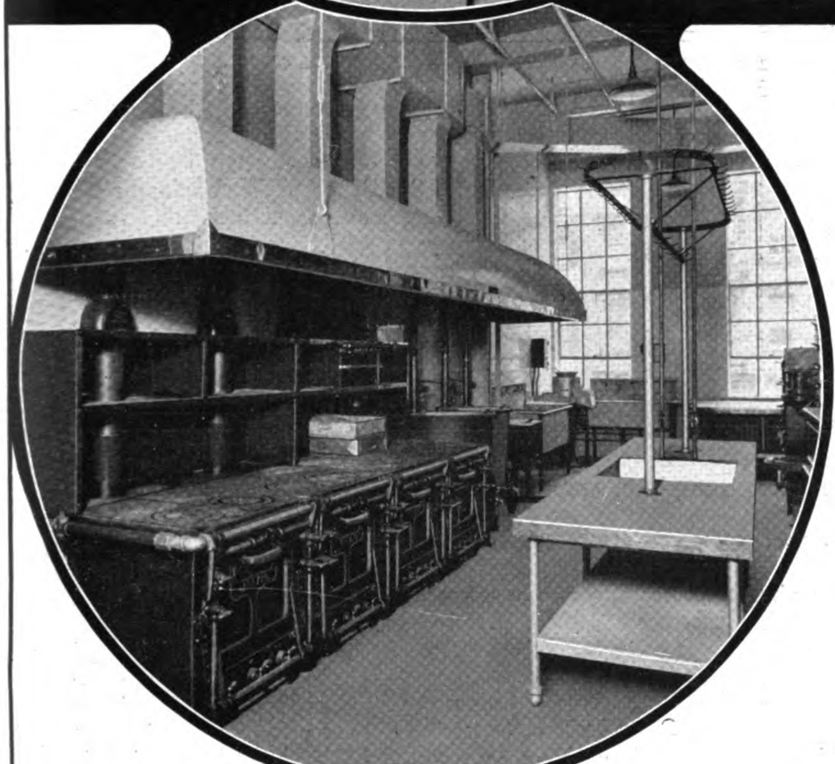
The alternating current is for the motors in the carpenter and machine shops, printing and perforating rooms, ventilating system, refrigerating, heating and air conditioning plants. The latter consumes 300 h. p. to regulate the temperature and the proper degree of humidity for the automatic developing and printing machines. The air for the rooms where the film is dried must be filtered, washed, dried and tempered, then re-dried, re-tempered and re-circulated.

The administration offices are equipped with General

KITCHEN, FOX FILM CORPORATION BUILDING.

Kitchen equipment—L. Barth & Son; composition flooring—The Marbleloid Co.





Through the Eye of the Camera another Barth Installation Is Shown

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ONE view of the Kitchen with its Gas Ranges, Cook's Table, Jacketed Kettles, etc., is given here. One view of the Dining Room is also shown. Note the Lunch Counter in the rear of the Dining Room. Altogether, 250 persons can be served at one time with this dining service equipment.

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Consultations, Criticisms and Suggestions
PROFESSOR D. VARON
Former Professor of Architectural Design at Syracuse University and at the University of Illinois.
Architect, Diplômé Paris
Author *"Indication in Architectural Design"*
309 BROADWAY, NEW YORK CITY

(Continued from page 54—text)

Electric Company's "Duplexalites" for general illumination and have "busy" lights outside of the chief executives' doors. The private projection rooms on this floor have both alternating and direct current for either arc lights or monoplane lamps. All parts of the building are in communication with each other by dictographs and the New York Telephone Company's wires. A complete fire alarm and central station watchman's system protects the entire building and in the studio, the watchmen can turn on pilot lights ahead of them and put them out after they have passed through.

The studio is divided into seven stages, about 55 feet by 100 feet, each of which has its complete electrical equipment to supply 2,000 amperes for hard and soft lights. The switchboards are 11 feet long and 10 feet high, enclosed in wire mesh. Each distributes current for Cooper-Hewitt skies, floor stands, duplex ceiling arcs, broadsides, spotlights or sunlight arcs sufficient to illuminate each stage with a million candlepower. The Cooper-Hewitt skies and overhead arcs roll from tracks attached to the roof construction and the overhead plugs are arranged so that neither they nor their cables will interfere with moving the units. On the switchboards are mounted remote control switches of the Lasky type, first developed by the E-J Electric Installation Company for the Famous Players-Lasky studio. These are operated either from push buttons at the switchboards or from small portable banks of push buttons on flexible cables, which can be moved around the studio floor. Thus, the lights can be grouped, turned on or extinguished by the director. A push button switch on the scenery can be used as one of the remote buttons to turn on or off all or part of the lights simultaneously with the fixture that it controls. The entire electric equipment of the building was installed by the E-J Electric Installation Company.

The Acme Wood Working Company, Inc., supplied all the office partitions, and the painting was done by the Sommer-Nestle Painting & Decorating Co. The kitchen and dining room equipment was installed by L. Barth & Son, and the composition floors were supplied by the Marbleloid Company. Sam Minskoff was the plumbing contractor, and the stage plugging boxes, plugs and connectors were all installed by the New York Calcium Light Company. The lattis trusses for the roof were supplied by McKeown Brothers Company. The sprinkler system was installed by the Raisler Sprinkler Company, and the night watch and fire alarm service is that of the American District Telegraph Company. The heating and ventilating systems were installed by the Raisler Heating Company. The Nicholas Power Company supplied the moving picture machines.

Current Notes

INDUSTRIAL EFFICIENCY.

Important new developments in labor relations, management, production methods and selling were brought out at the meeting of the Taylor Society held in Rochester, N. Y., May 6, 7 and 8. Prominent manufacturers, managers, industrial engineers and sales executives from all parts of the country presented papers and took part in the discussions which proved that the society, which has for its object the promotion of scientific management, is extending its field beyond the factory. The meeting was held under the auspices of the Industrial Management Council and the Manufacturers' Council of the Chamber of Commerce.

How manufacturers are losing production because of improper factory lighting was demonstrated by Ward Harrison, well-known illuminating engineer of Cleveland. In a paper on "The Necessity for Standards of the Relation Between Illumination and Output," he pointed out that tests in factories had shown that many manufacturers are saving $1 in improved lighting and wasting $10 in production. Increased production amounting to from 10 to 20 per cent. have followed lighting betterments. He said that night shifts were inefficient partly because of poor lighting. In plants averaging 100 sq. ft. of floor space per employe the cost of good artificial lighting per foot candle supplied is usually not over 0.1 per cent. of employe's pay during the period. In discussing this paper, W. H. Leffingwell of the Leffingwell-Ream Co., showed charts which plot lighting intensities on every square foot of an office or factory by different colors.

There is certainly an opportunity in the building industry for improved methods of coordination of forces. The expansion of the Taylor system to include this field would be an interesting experiment.

Mr. Ralph H. Cameron announces the removal of his architectural offices from 606 Frost Building to 1115-16 Central Trust Building, San Antonio, Texas.

(Continued on page 22)

June

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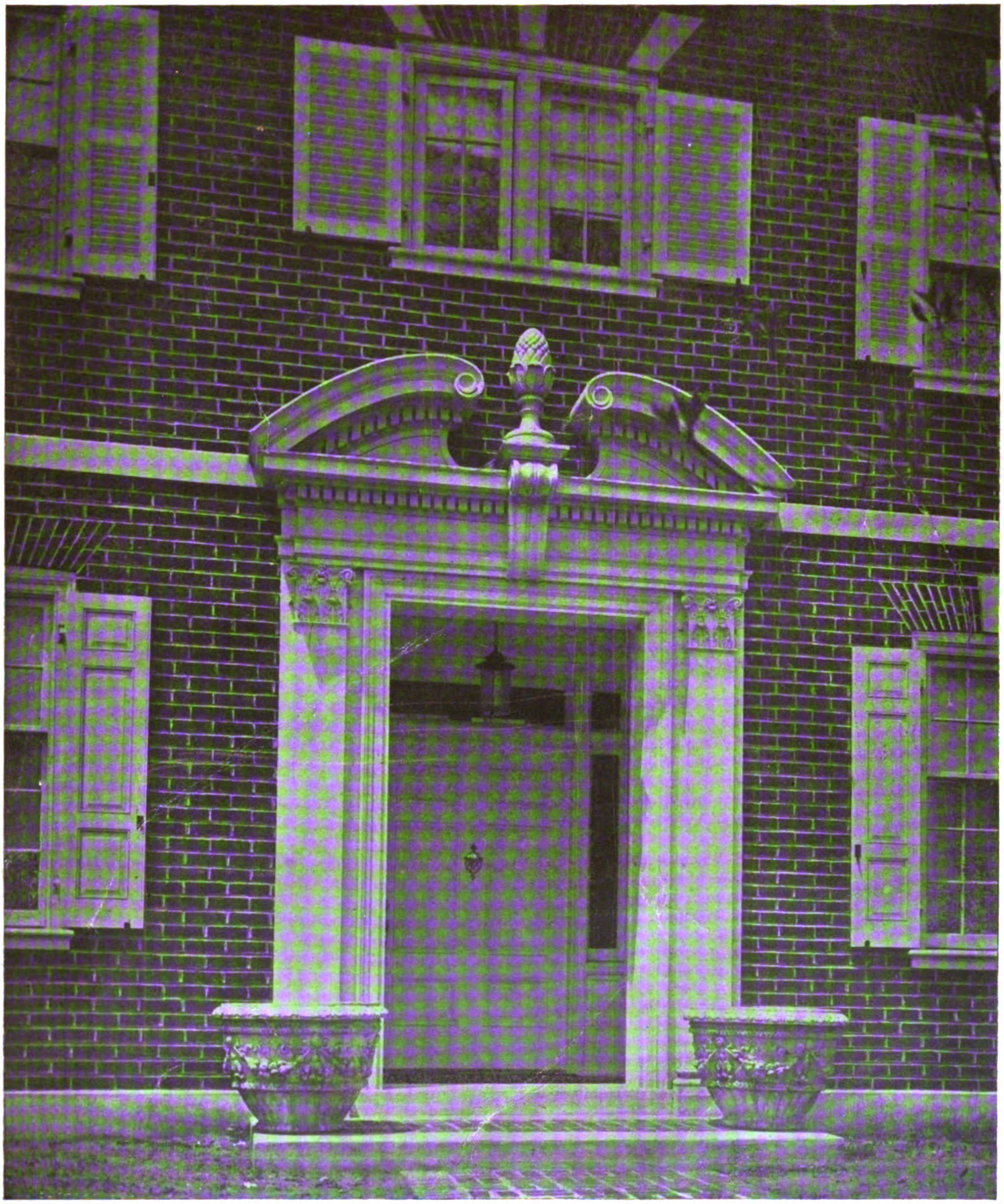

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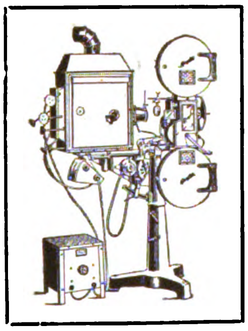

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Volume LII | **Number 6**

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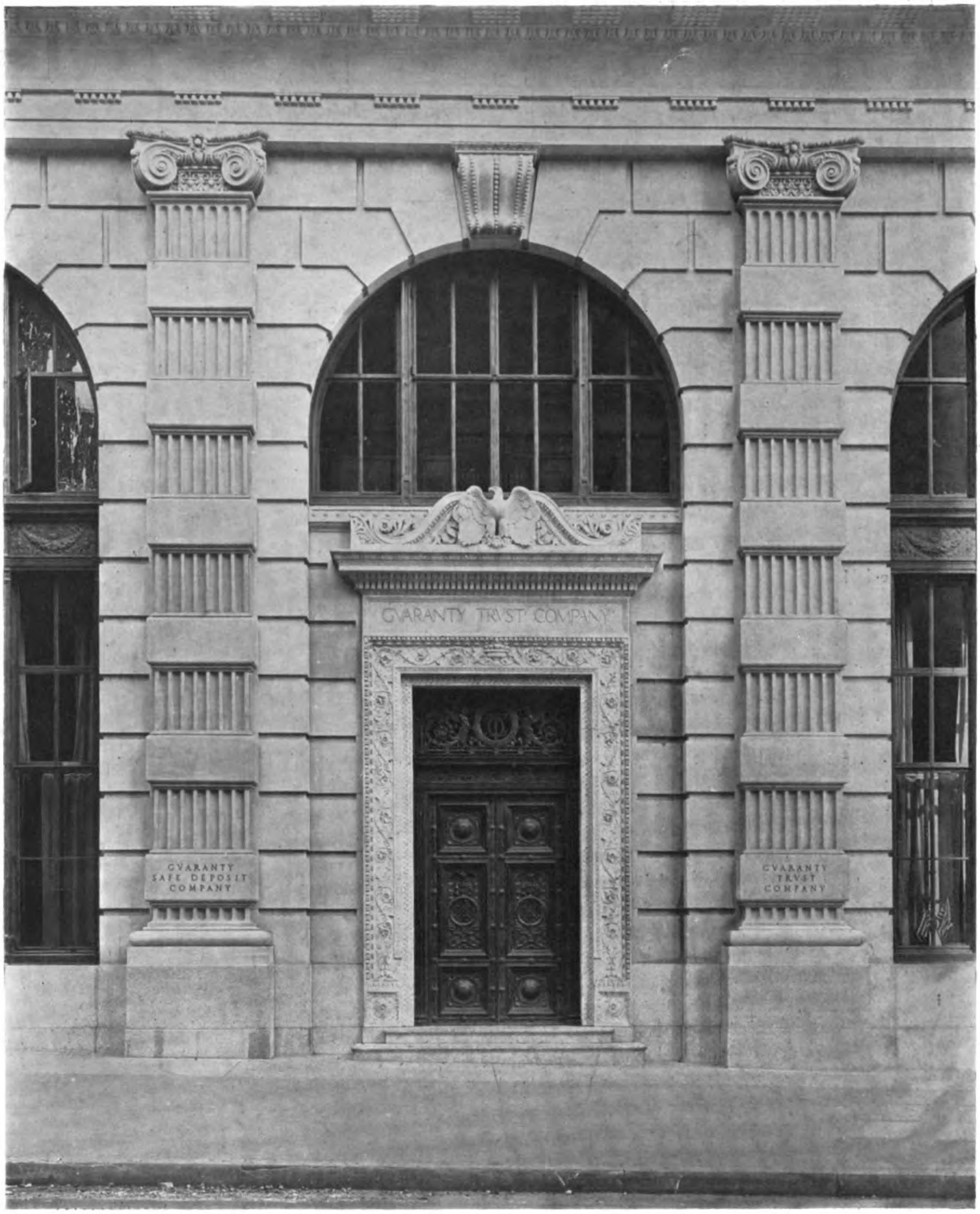


DETAIL OF FIFTH AVENUE ENTRANCE, GUARANTY TRUST COMPANY, NEW YORK CITY.

Cross & Cross, Architects.

Models—Ricci, Zari & DiLorenzo.

ARCHITECTURE AND BUILDING

A Magazine Devoted to Contemporary Architectural Construction

WILLIAM P. COMSTOCK
Managing Editor

Volume LII JUNE, 1920 **Number 6**

THE NEW GUARANTY TRUST BUILDING.

The new Fifth Avenue office for the Guaranty Trust Company, at the south corner of Fifth Avenue and Forty-fourth Street, New York City, embodies in its construction the ideas and refinements gained from the experience of the designers and from the experience of the Trust company officials in their other banking quarters in the city. The greatest efficiency for the conduct of business is secured, together with most substantial construction and appropriate dignity in finish and decoration.

The entrance from Fifth Avenue is through sliding double doors of bronze, in Spanish design; similar to those of St. Bartholomew's Church, Ricci, Zari & Di Lorenzo, architectural sculptors, under the direction of Cross & Cross, the architects, made the models for three 600-pound bronze doors. Edward Ardolino carved the granite portal. The Spanish style is also adhered to in the bronze grille work, and appointments of the interior, which was executed by the Gorham Company. There are three entrances to the main banking floor, from Fifth Avenue, from Forty-fourth Street, and from the corridor of the building. That from Fifth Avenue opens upon a corridor twenty-one feet wide, running the entire length of the main floor. That from Forty-fourth Street opens upon a transverse corridor of the same width which leads to the section of the main floor especially designed for the convenience of women customers. Entrance from the corridor of the building is through a door opening into the bond department and thence to the banking room.

Massive Doric columns extend the length of the banking room and form a corridor on each side of which are the working spaces of the various departments. These with the low balustrades running between them are of Hauteville marble. The main corridor is floored with pink Tennessee marble. Throughout the working spaces of the bank the floors are of cork. The ceilings have been specially treated for acoustic purposes. The side walls of the bank are of Eauville stone.

Immediately to the right of the Fifth Avenue entrance is space for the bank officials. There are three conference rooms along the westerly side of this section. Behind the middle room is the telephone and stock ticker room.

Farther along, on the same side, between the office space and the transverse corridor from Forty-fourth Street, is the loan department. There are four windows on the main corridor and another on the transverse corridor. Back of the loan department are desks for officers' stenographers and the new business department's files.

To the left of the Fifth Avenue entrance, directly across the corridor from the officers' section, is the bond department.

The corridor from the Forty-fourth Street entrance leads directly to the space reserved for the accommodation of women customers. On each side there are tellers' cages and along the center line of the transverse corridor, check desks. Above this space is a rotunda, with a light and air shaft above. The high ceiling permits a mezzanine furnished with easy chairs, writing tables, telephones and other conveniences.

From the space under the rotunda, a door leads into the reception room for ladies. This room is paneled in antique oak, has a marble fireplace and is suitably appointed. There are telephone booths just off the room. It is also equipped with an automatic elevator to the mezzanine gallery. To the right of this reception room is a retiring room.

Immediately to the right of the Forty-fourth Street entrance are the elevator and stairs leading to the safe deposit vault in the basement. Forward of these, on the same side of the transverse corridor, is the trust department. Here the space for the officers opens on the main corridor. There is a conference room for consultation between officials or with customers. Down the main corridor are the four windows of the securities tellers. Directly back of these tellers are the securities and custody departments, and, alongside, the personal trust department. In front of the latter, with three windows on the main corridor, is the Liberty loan exchange department. Adjoining the trust department is the credit department, entered by a door from the main corridor. Near the door are the pass book and information windows. The remaining space on this northerly side of the main corridor is occupied by the foreign department, the officers' section and an adjoining conference room being at the westerly side.

On the south side of the main corridor and adjoining the women's section are the tellers' cages, with the transit department back of them. The coupon and collection departments occupy the greater part of the remaining space on this side of the banking floor. In the extreme southwestern corner of the main floor are spaces for stenographers and the general files. Along the western end of the floor there is a small corridor, off of which are the bank's private elevators.

The unit system has been adopted in the tellers' department. In each of the cages there will be two men, each of whom will both receive and pay, so that customers can make deposits and withdrawals at the same window. In addition to the convenience which this will afford, will be the further advantage of having each window lettered in accordance with an alphabetical division of customers. The use of the window with which the customer's name corresponds will assure him of always finding there a teller who knows him and his signature. For the present there will be five units and a head teller's unit, the latter handling only payrolls and certifications, and acting as a supply unit for the other five. Having the transit department directly in the rear of the tellers' cages will greatly facilitate operations, as the tellers will merely balance their cash, all checks being turned over to the transit department. The tellers' trucks, one for each unit, are constructed so as to fit under the counters and the drawers in the trucks may be used as cash drawers. Each cage is equipped with a telautograph in direct communication with the head teller's unit and with the main and Madison Avenue offices.

The vault system of the Fifth Avenue office comprises the safe-deposit vault in the basement and the vault for banking and storage purposes in the sub-basement. The latter is eighty-three feet long and thirty-three feet wide, and has two sections, one thirty feet long being reserved for the bank's own cash and securities, with separate compartments for the various banking departments, the other, fifty-three feet long being reserved for the storage of silver, pictures, trunks, chests, or other property of customers. This end of the vault is fitted with racks of iron piping running around three sides and forming sections of three compartments, each compartment providing space for at least one trunk. Just outside the entrance to this section of the vault is an examination room for the use of customers. There is a corridor around the vault, separating it from the rest of the sub-basement. This remaining space is taken up by the boiler room, coal bunkers, waste paper depository, and, along the Fifth Avenue side, the archives storage rooms.

The safe-deposit vault in the basement is directly above the sub-basement vault, is of the same length and width, but is higher and of somewhat different construction. An oblong door giving entrance to the vault from the Forty-third Street side is for the convenience of tenants of the building, who will be able to reach it by elevator from the stories above. Entrance by other customers will be through the main door on the Forty-fourth Street side of the vault. This entrance is reached by the elevator or the stairs at the right of the Forty-fourth Street entrance to the main banking floor. At the foot of the stairs is a large foyer, separated from the control room by a steel grille. At one side of the foyer is a working space for clerks and at the other is a ladies' room.

Within are the safe-deposit boxes and the coupon booths. Of the former there are 10,000, but provision is made for 5,000 more if they should be required. There are ninety-nine coupon booths, of which a certain number can be sub-divided to provide for twenty-seven more. Each booth is well lighted and equipped with a cork covered shelf with glass back and ends, and a sunken receptacle for writing materials. Each booth will also have a call bell and a plug for a portable telephone, through which communication may be established with any department of the bank or with outside parties.

The walls, floors and ceilings of the vaults are made of reinforced concrete two feet thick, with three rows of reinforcing bars running vertically and diagonally. The safe-deposit vault is strengthened further by two and one-half inches of steel, made up of five layers of different kinds of steel. The exterior of the walls, floors and ceilings are covered with five and a half miles of protective wiring. The vaults are heated and ventilated by a fan system separate from the heating unit of the building. The fresh air duct and foul air exhaust are operated by means of double fans. By a unique arrangement the ventilation system is so broken, when the vault is closed, as to leave no connection with the inside. This is accomplished through the attachment to the lowering platform of a duct which folds up inside the vault when the door is closed. York Safe & Lock Co. manufactured the vault and safes.

The mailing and messengers departments will also be located in the basement, and in addition there are lockers and wash-rooms for employes, besides stationery and supply rooms and space for archives.

In the rear of the building between the first and second stories is a mezzanine where are located lockers for women employes and a rest room. This mezzanine and the second story may be reached by stairs or elevators from the small corridor along the extreme westerly side of the banking floor.

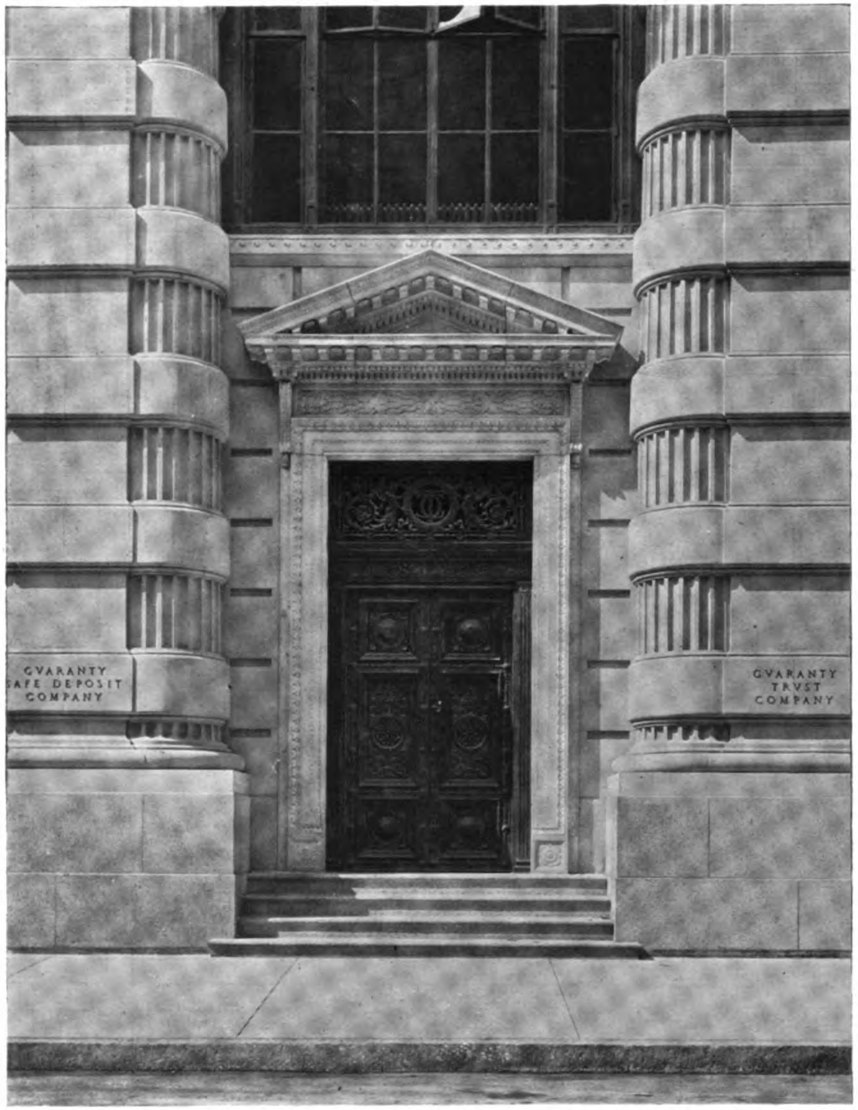
The telephone room, the medical department, the stencil department (a soundproof room with windows overlooking Forty-fourth Street) are in the second story. A corridor runs down the center of this floor from the elevators to the gallery around the women's section of the main floor. Toward Fifth Avenue on the left, and adjoining the stencil department, are the bookkeeping and auditing departments. Across the corridor are the quarters of the bond department's outside salesmen and clerical forces, a large meeting room for the use of customers, three conference rooms, and a room for the income tax department.

The next eight stories of the building are for office rental and are reached by the elevators in the corridor running along the southerly side of the building, separate from the banking floor and reached by a separate entrance from Fifth Avenue.

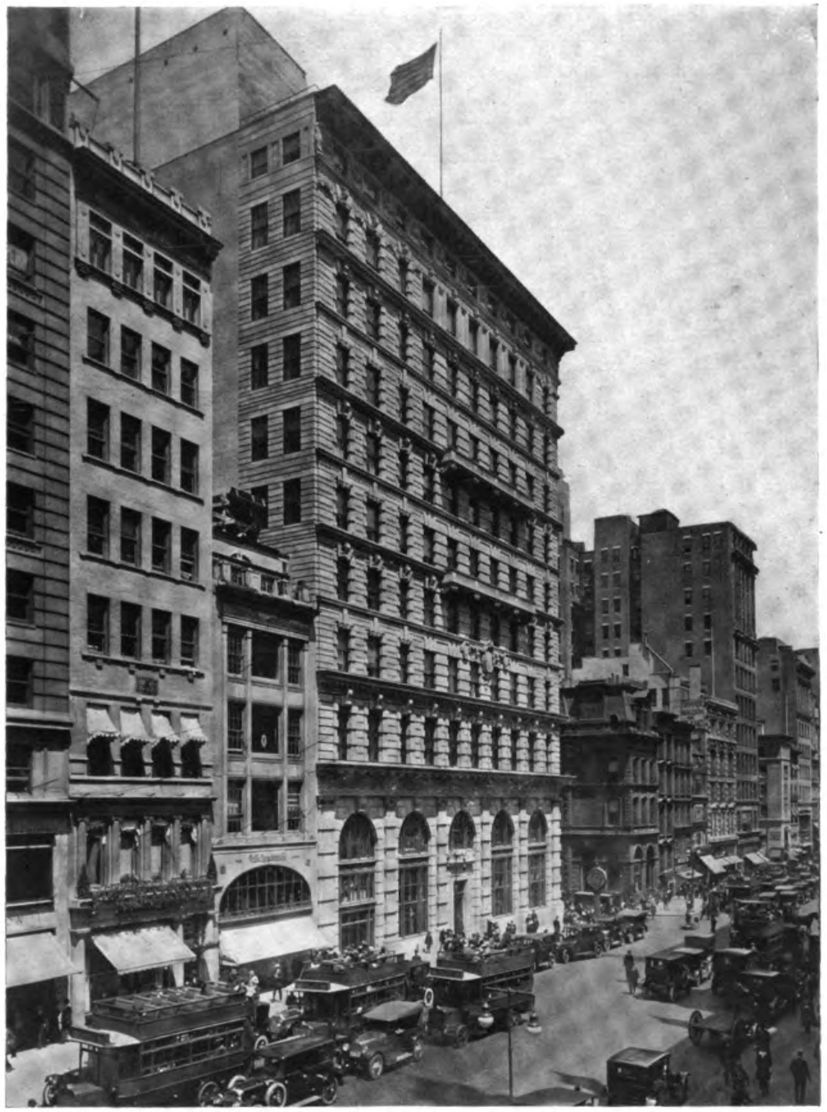
The eleventh and top story of the building, reached by the bank's elevators at the westerly end of the building, is occupied by the company. To the left of the elevators is the women's club room. Directly opposite is the women's dining room, adjoining the women's club room is the restaurant manager's office and the storeroom, with the kitchen and refrigerator opposite. On the same side as the manager's office is the men's club room, with the men's dining room directly across the corridor. Farther toward the Fifth Avenue end of the building, and on the same side, is the dining room for officers.

All the bronze work in this bank was executed by The Gorham Company and the interior marble work by Batterson & Eisele. Tompkins-Kiel Marble Co. furnished the Napoleon Gray Marble used throughout the main corridor and for wainscoting on upper floors. The Hayden Co. supplied the furniture for the departments. The ornamental and plain plastering was done by T. A. O'Rourke, Inc., and Hatzel & Buehler, Inc., were the electrical contractors. Frink reflectors are used in the main banking room. Meyer-Strong & Jones were the consulting engineers for the heating and ventilating systems, elevators and wiring, and Clyde R. Place was the consulting engineer for the building.

The clock system, which was installed by E. Howard Clock Co., is the most modern of its kind. The Master Clock is of the self-winding type and is cased in solid mahogany and richly finished in satin gloss, Adam brown color. The clock in the main banking room has a

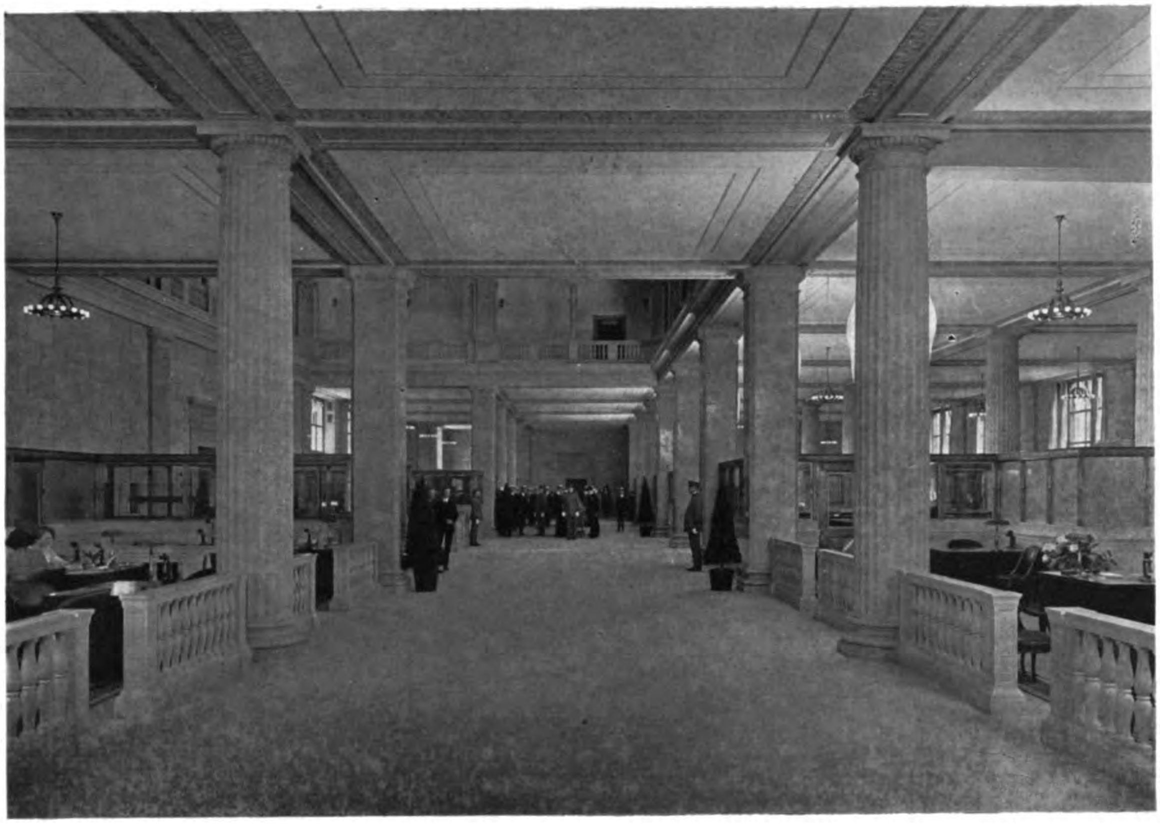


Built by Todd, Irons & Robertson, Inc.; stone carving—Ardolino Bros.; tile roofing and waterproofing—T. New Construction Co.; cement floors and walks—Harrison & Meyer; plumbing contractors—James McCullagh, Inc.; toilet room supplies and holders—A. P. W. Paper Co.; ornamental and miscellaneous iron work—J. Cutler Iron Works, Inc.

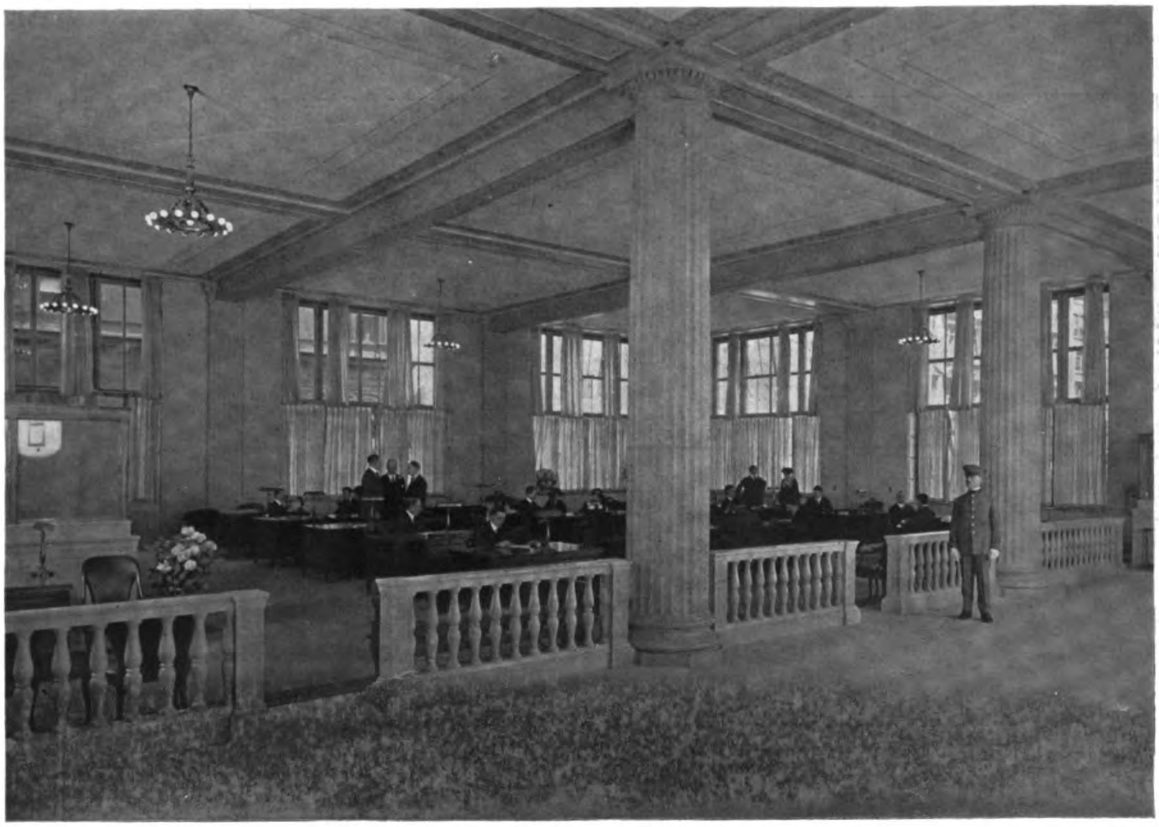


GUARANTY TRUST COMPANY, 44TH STREET AND FIFTH AVENUE, NEW YORK CITY.

Cross & Cross, Architects.
Clyde R. Place, Consulting Engineer for the Plumbing.
Meyer, Strong & Jones, Consulting Engineers for the Heating, Ventilating, Elevators and Electric Wiring



GENERAL VIEW, MAIN BANKING ROOM.

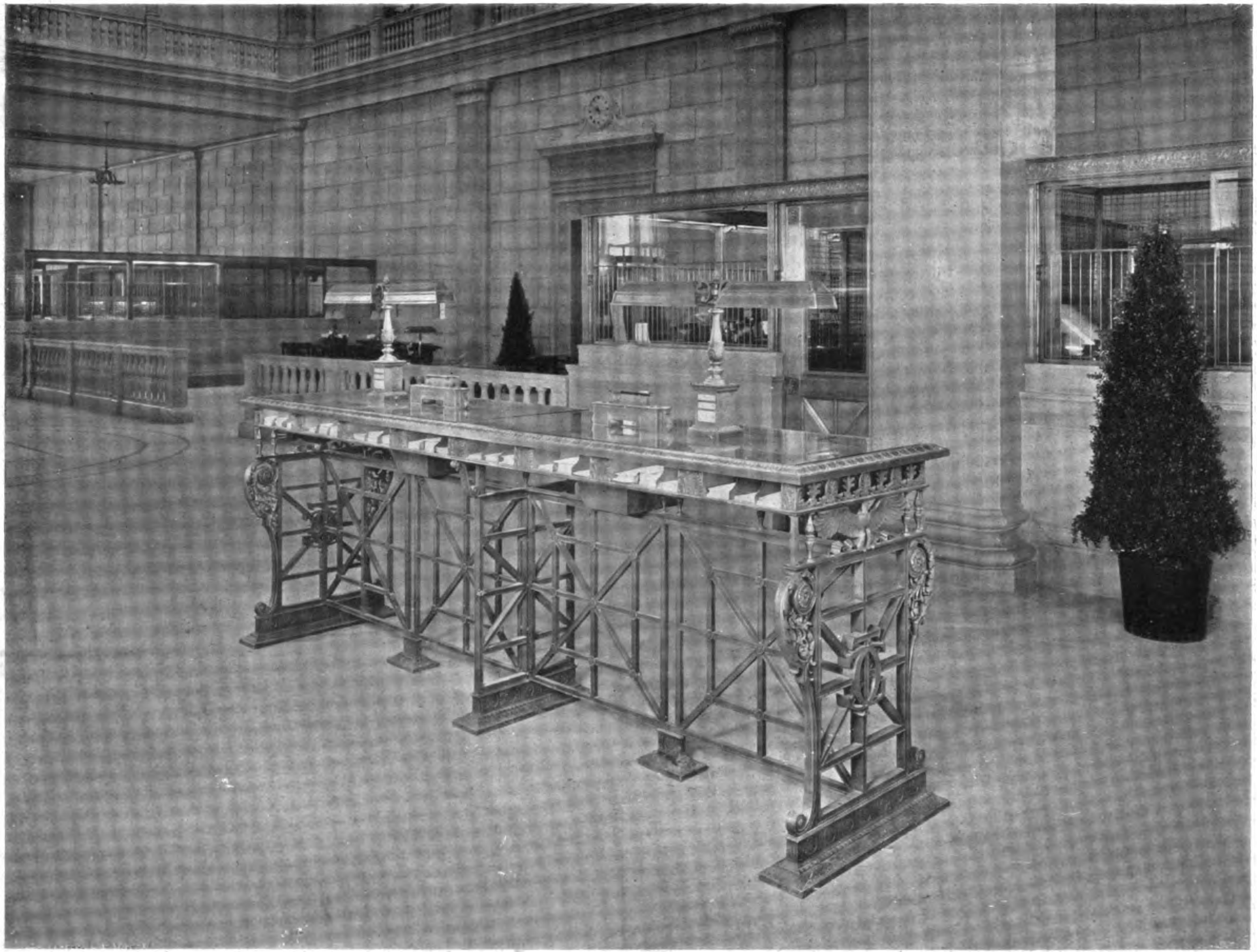


OFFICERS' SECTION, GUARANTY TRUST COMPANY, 44TH STREET AND FIFTH AVENUE, NEW YORK CITY.

Cross & Cross, Architects.
Clyde R. Place, Consulting Engineer for the Plumbing.
Meyer, Strong & Jones, Consulting Engineers for the Heating, Ventilating, Elevators and Electric Wiring.

ARCHITECTURE AND BUILDING. Plate 61.

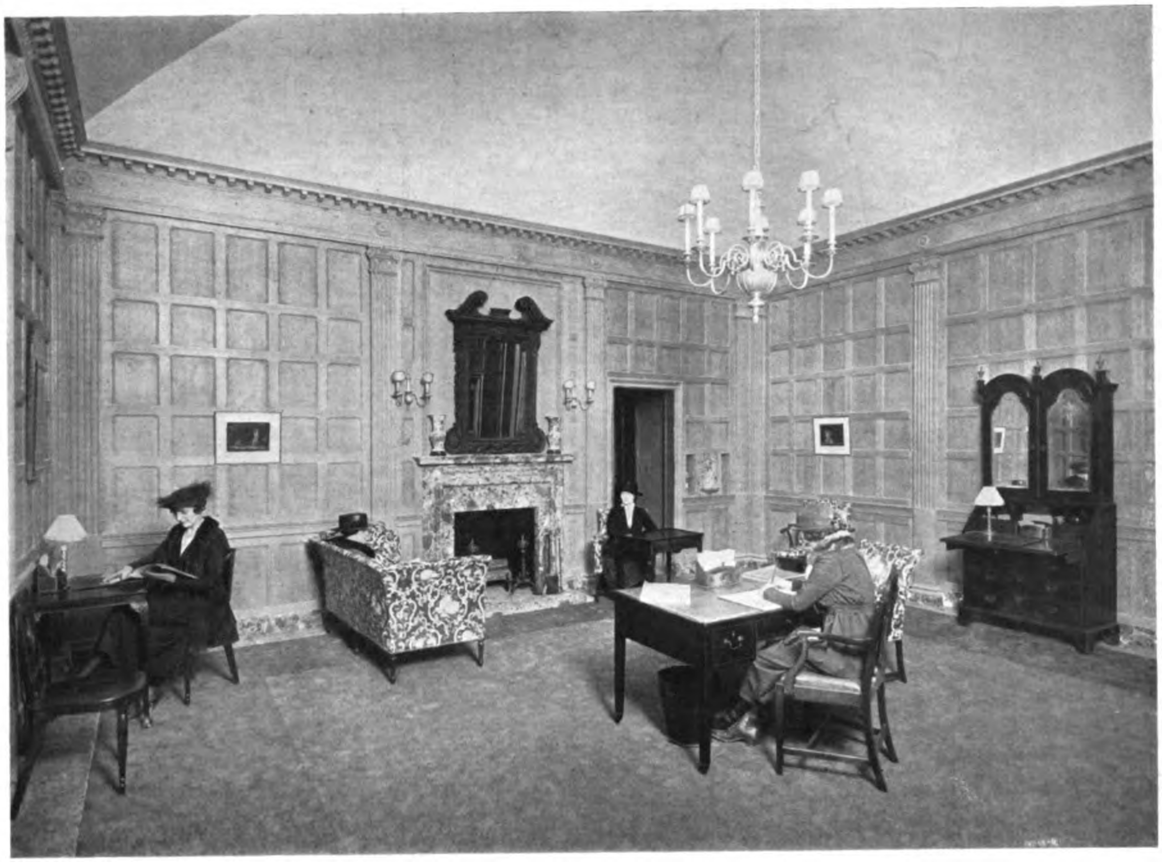
Built by Todd, Irons & Robertson, Inc.; models—Ricci, Zari & DiLorenzo; Napoleon gray marble furnished by Tompkins Kiel Marble Company and finished by Batterson & Eisele; electrical contractors—Hatzel & Buehler, Inc.; Frink reflectors used; hollow metal windows—Lawton-Stephens Co., Inc.; painting—Hyman Shatz; mason contractors—Fullam Construction Co.; hollow metal doors and trim—Empire Art Metal Co., Inc.; furniture—The Hayden Co.; ornamental and plain plastering—T. A. O'Rourke, Inc.



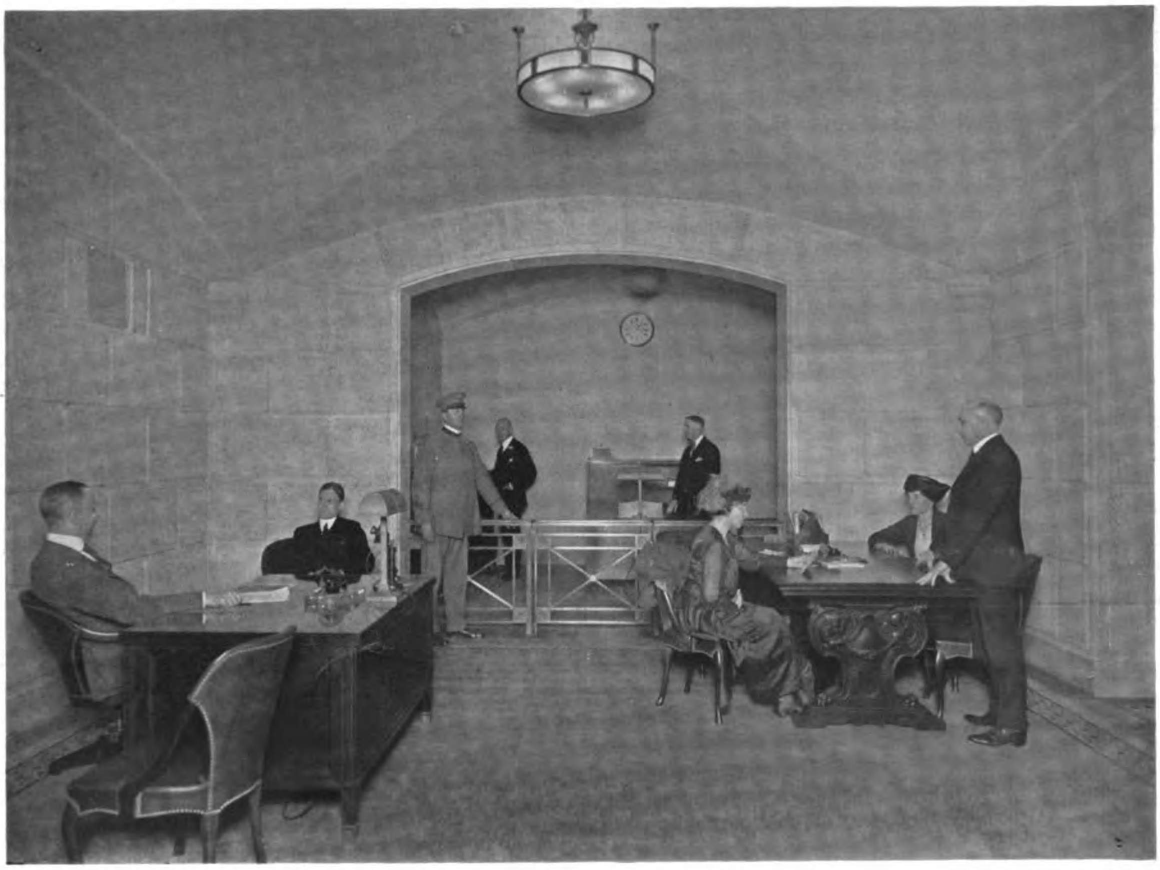
ONE OF THE BRONZE CHECK DESKS IN THE MAIN CORRIDOR, GUARANTY TRUST COMPANY, 44TH STREET AND FIFTH AVENUE, NEW YORK CITY.

Cross & Cross, Architects.

Architecture and Building. Plate 62.
Built by Todd, Irons & Robertson, Inc.; bronze work—The Gorham Co.; clock system—E. Howard Clock Co.; tile work—Wm. H. Jackson Co.



RECEPTION ROOM FOR LADIES

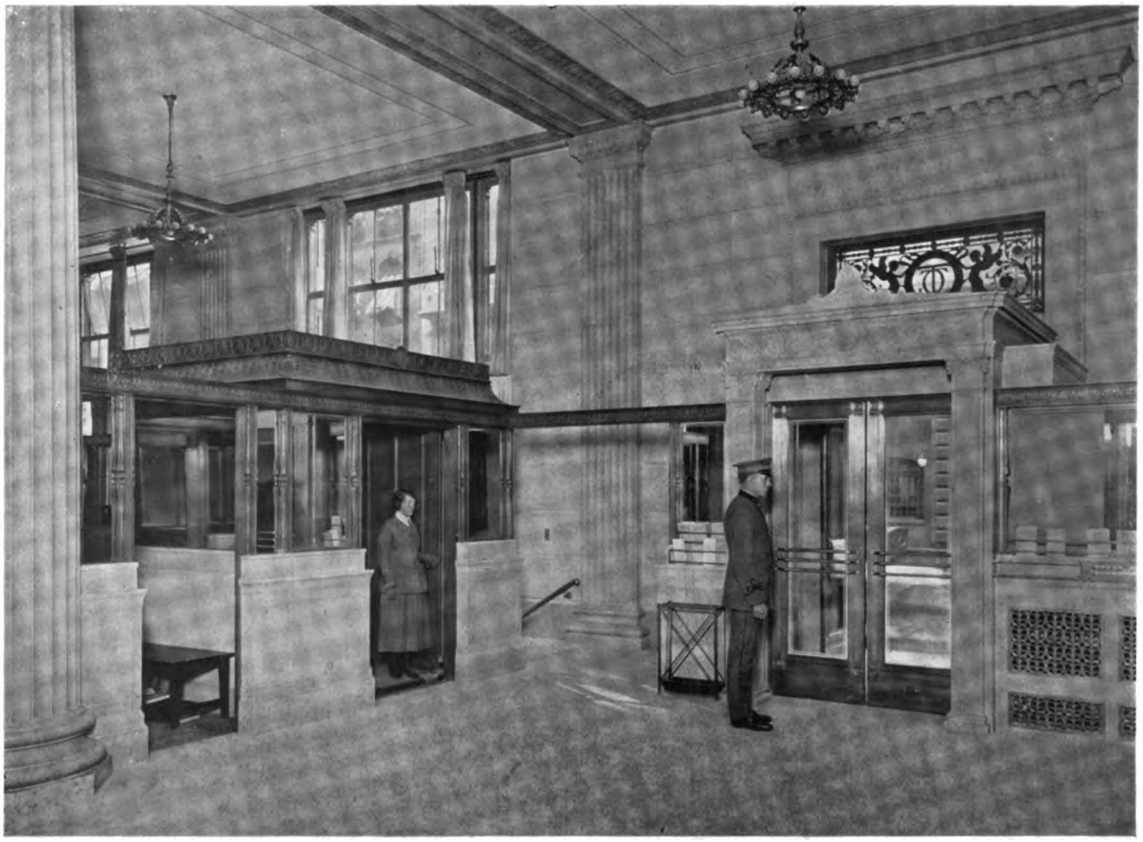


FOYER ENTRANCE TO SAFE DEPOSIT VAULT, GUARANTY TRUST COMPANY, 44TH STREET AND FIFTH AVENUE, NEW YORK CITY.

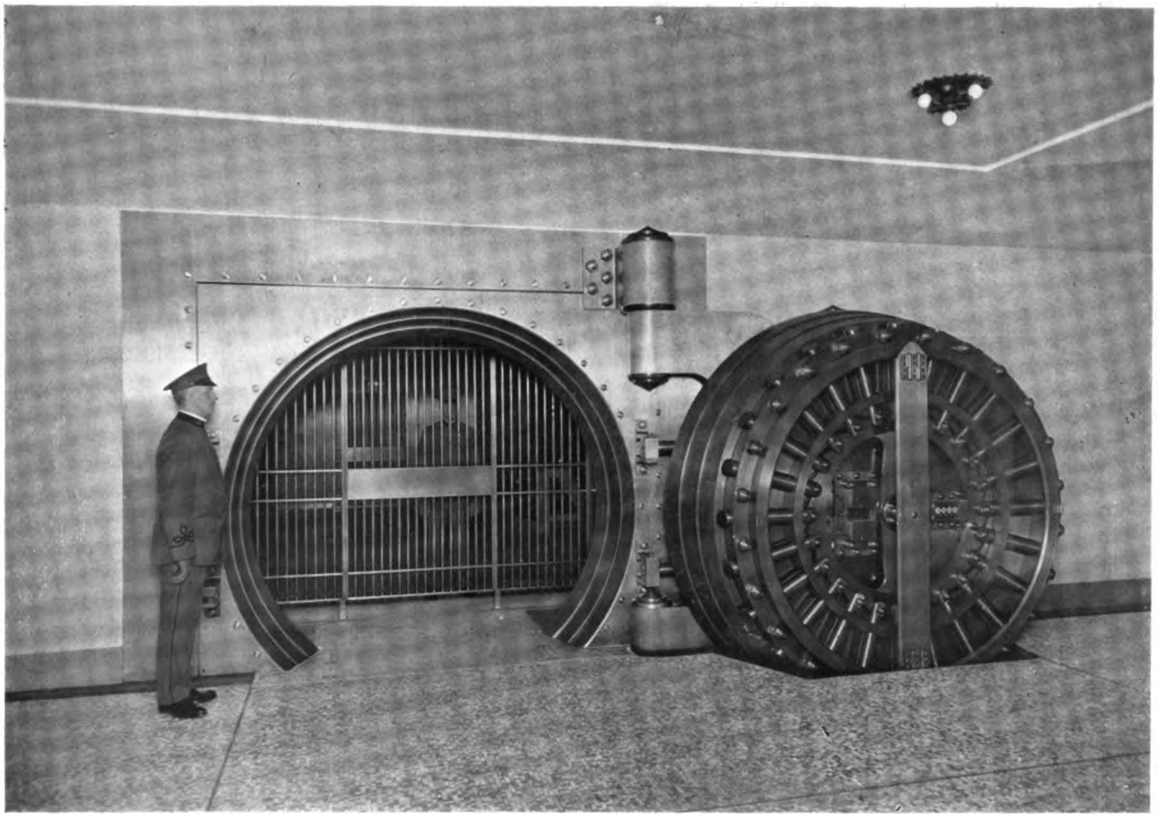
Cross & Cross, Architects.

ARCHITECTURE AND BUILDING. Plate 63.

Built by Todd, Irons & Robertson, Inc.; furniture—The Hayden Co.; ornamental and plain plastering—T. A. O'Rourke, Inc.; models—Ricci, Zari & DiLorenzo.



INSIDE VIEW, 44TH STREET ENTRANCE, SHOWING CONVENIENT LOCATION OF PRIVATE ELEVATOR TO SAFE DEPOSIT VAULT.

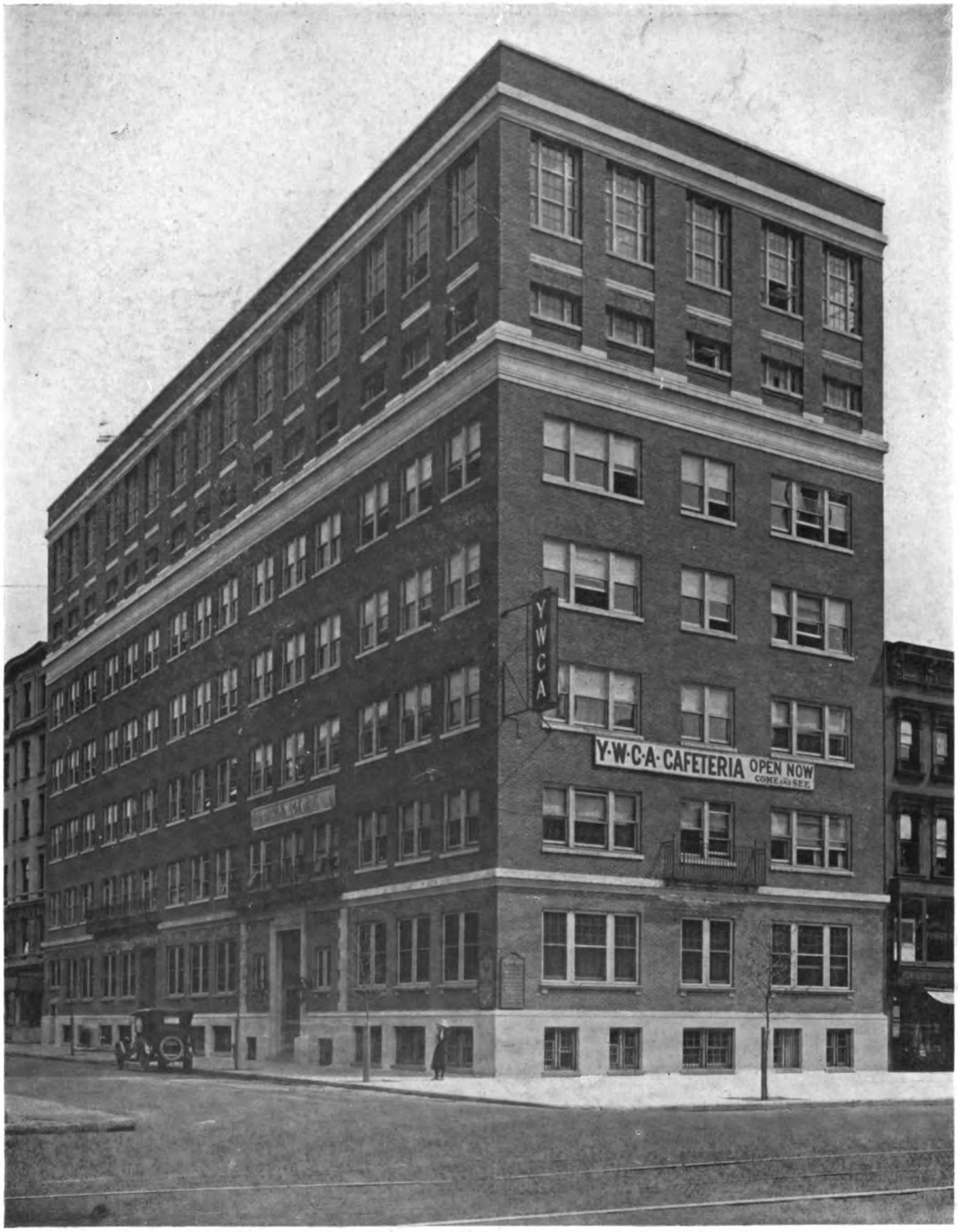


ENTRANCE TO SAFE DEPOSIT VAULT, GUARANTY TRUST COMPANY, 44TH STREET AND FIFTH AVENUE, NEW YORK CITY.

Cross & Cross, Architects.
Clyde R. Place, Consulting Engineer for the Plumbing.
Meyer, Strong & Jones, Consulting Engineers for the Heating, Ventilating, Elevators and Electric Wiring.

ARCHITECTURE AND BUILDING. Plate 64.

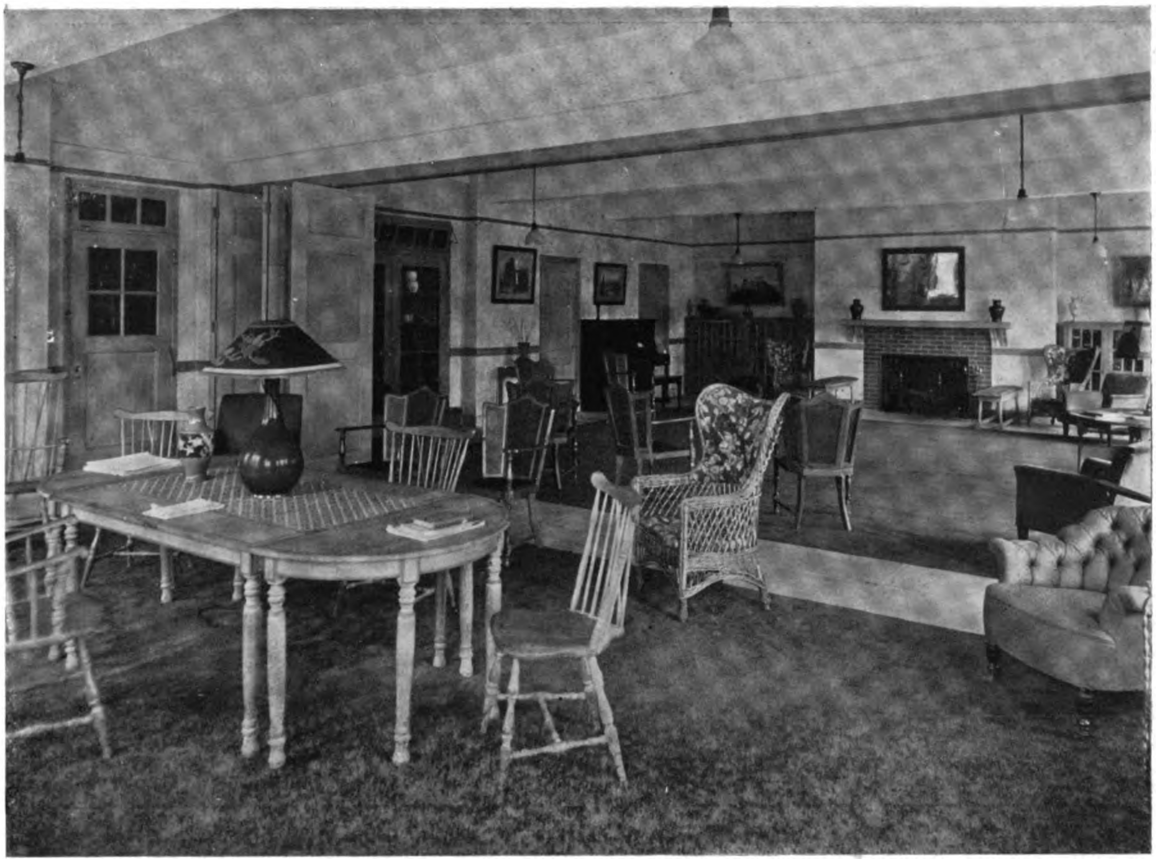
Built by Todd, Irons & Robertson, Inc.; electrical contractors—Hatzel & Buehler, Inc.; vault work and safes—York Safe & Lock Co.; vault inspection—Robert W. Hunt & Co.

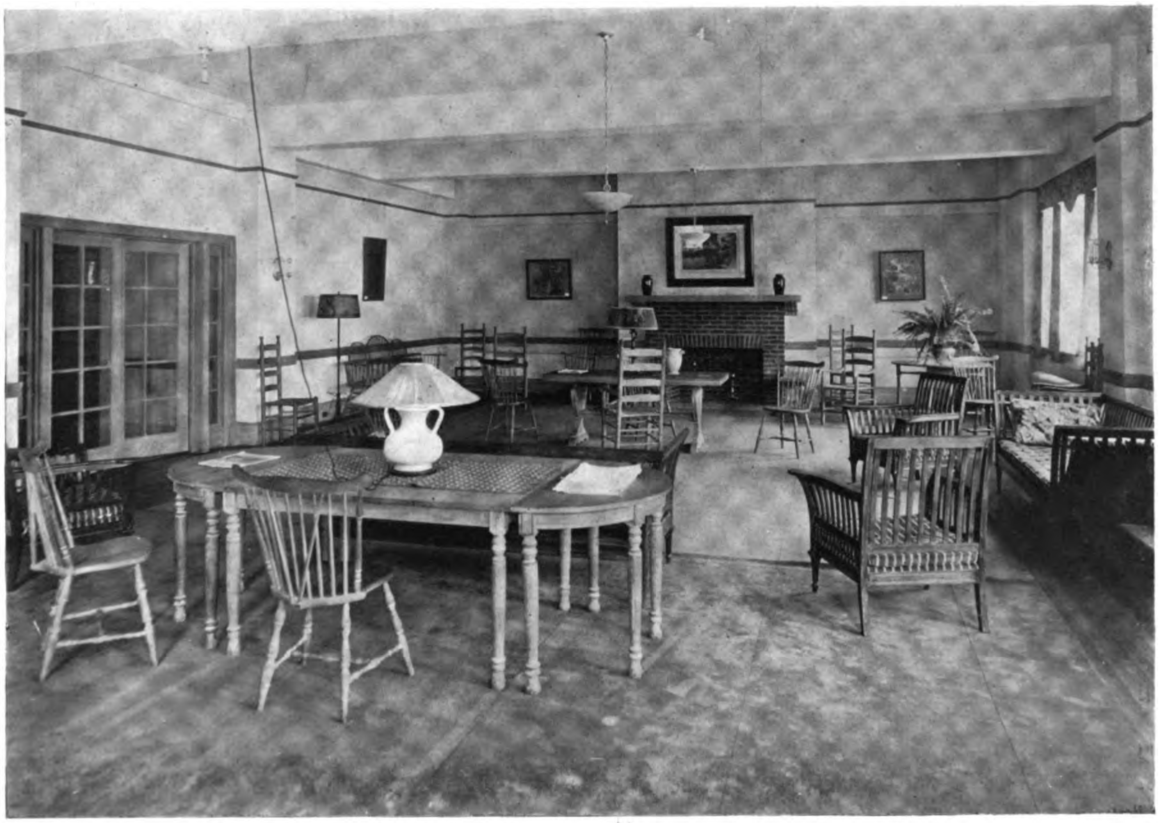


Y. W. C. A. BUILDING, 124TH STREET AND LENOX AVENUE, NEW YORK CITY.

Jallade & Lindsay, Architects.

ARCHITECTURE AND BUILDING. Plate 65.
Built by Tucker & Lewis; ornamental iron work—A. Perlman Iron Works.



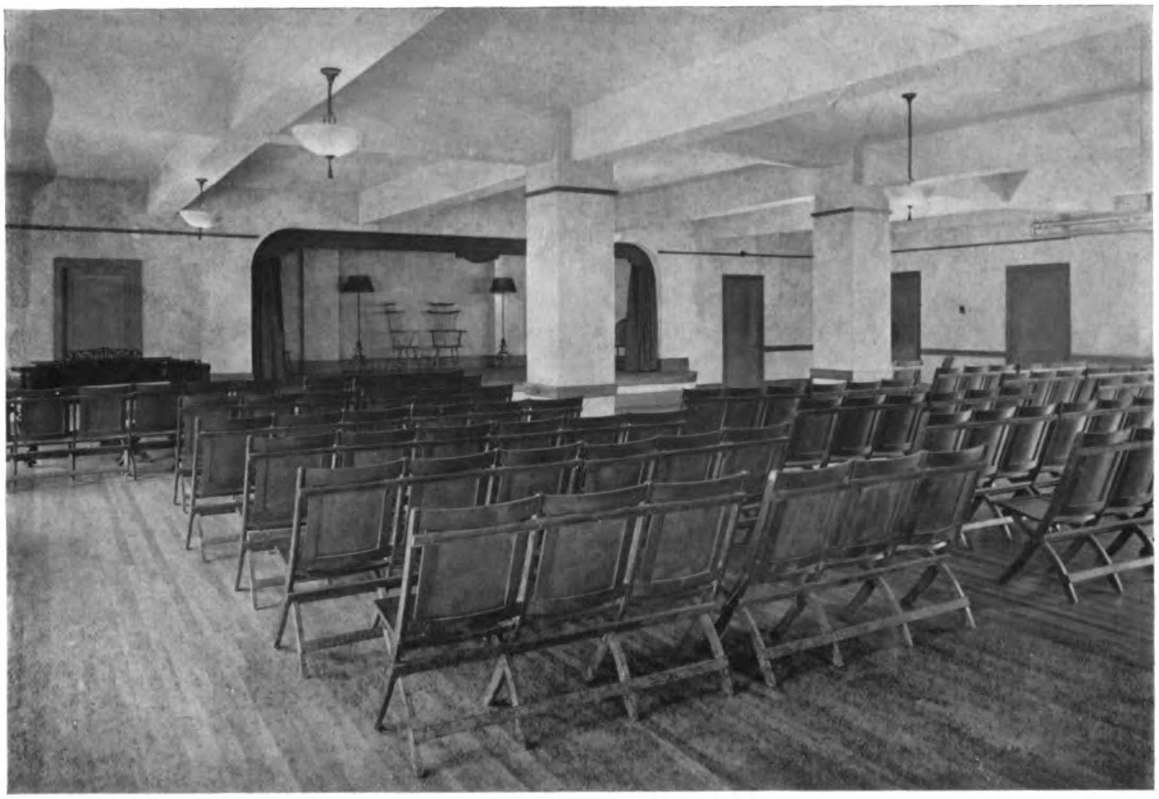


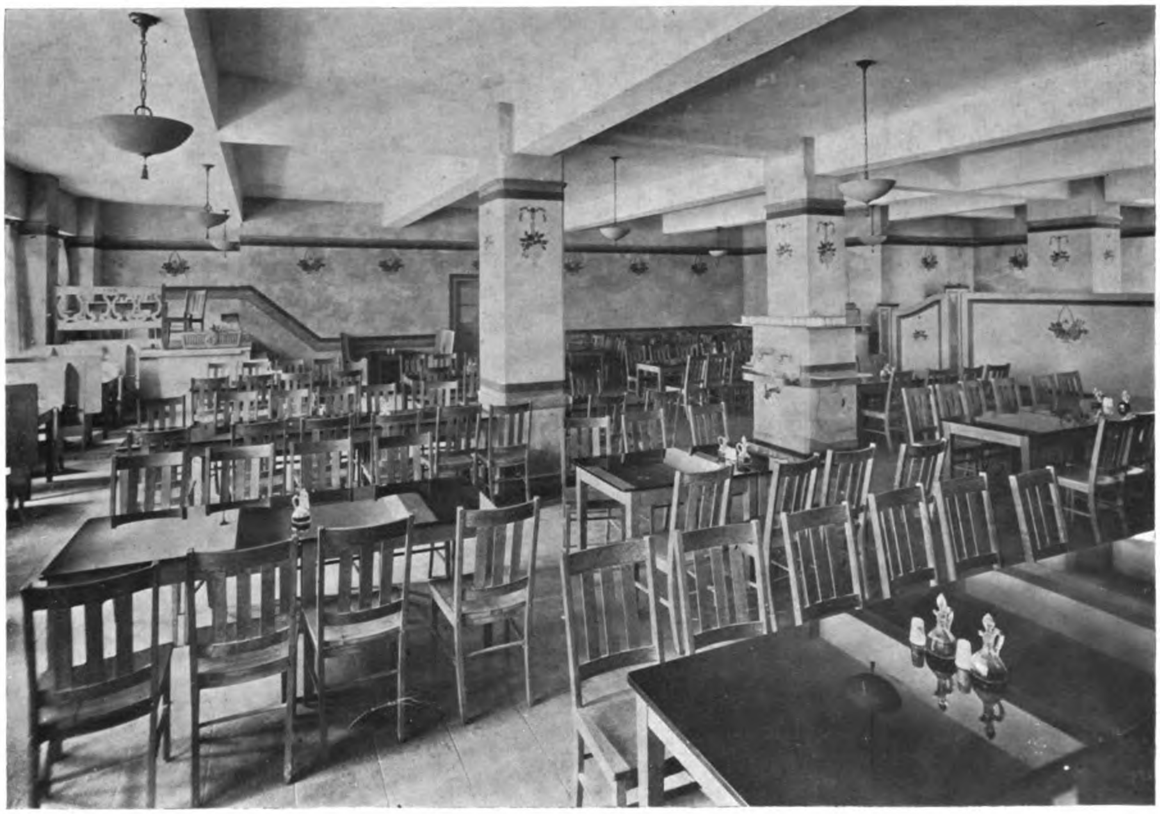
RECEPTION AND CLUB ROOMS, Y. W. C. A. BUILDING, 124TH STREET AND LENOX AVENUE, NEW YORK CITY.

Jallade & Lindsay, Architects.

ARCHITECTURE AND BUILDING. Plate 66.

Built by Tucker & Lewis; plastering contractors—D. McPherson; paints made by the Sherwin-Williams Co.; painting—George S. Hall Co.



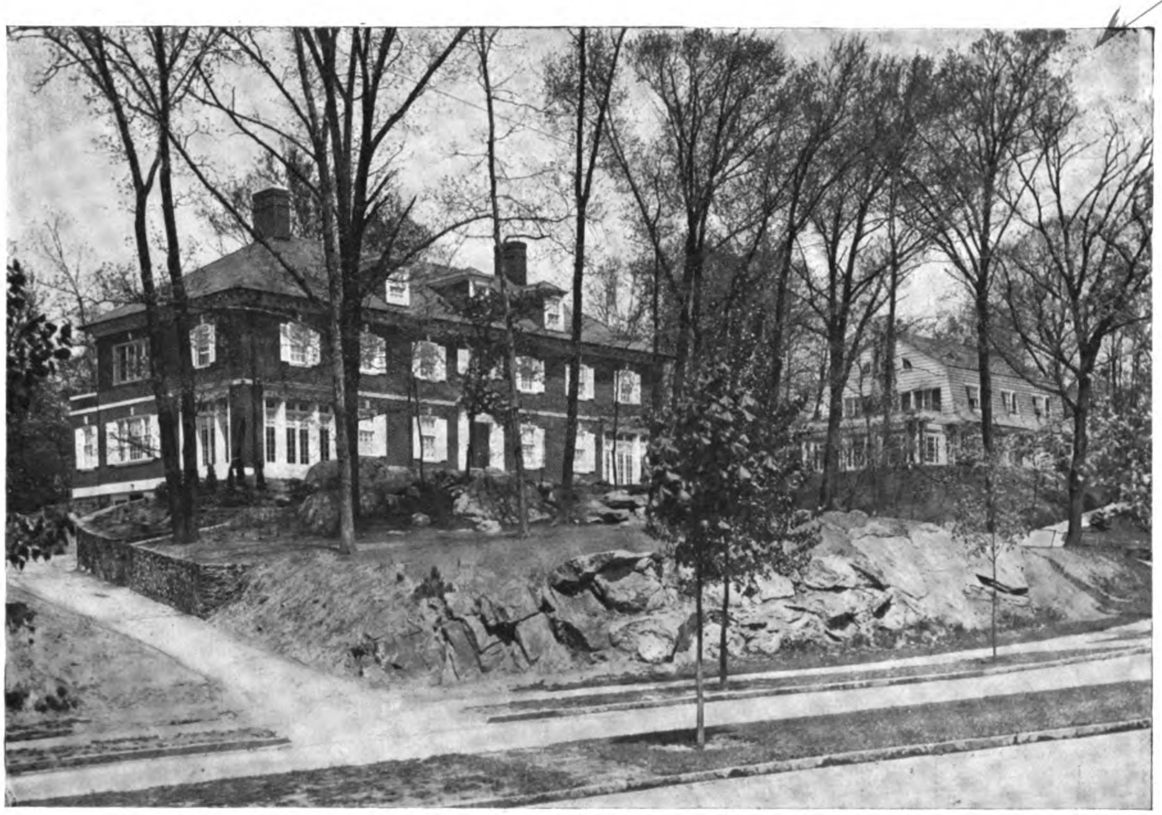


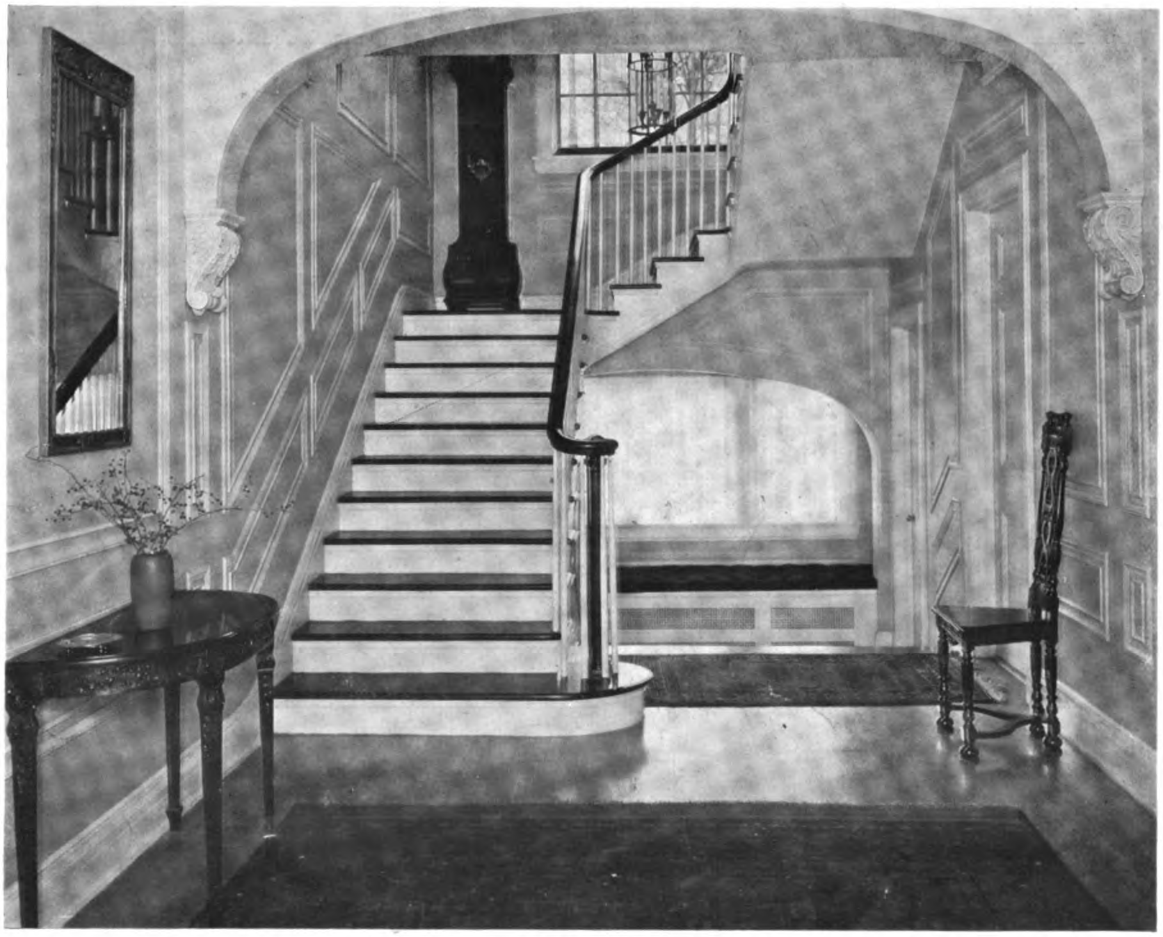
AUDITORIUM AND CAFETERIA, Y. W. C. A. BUILDING, 124TH STREET AND LENOX AVENUE, NEW YORK CITY.

Jallade & Lindsay, Architects.

ARCHITECTURE AND BUILDING. Plate 67.

Built by Tucker & Lewis; plastering contractors—D. McPherson; paints made by the Sherwin-Williams Co.; painting—George S. Hall Co.

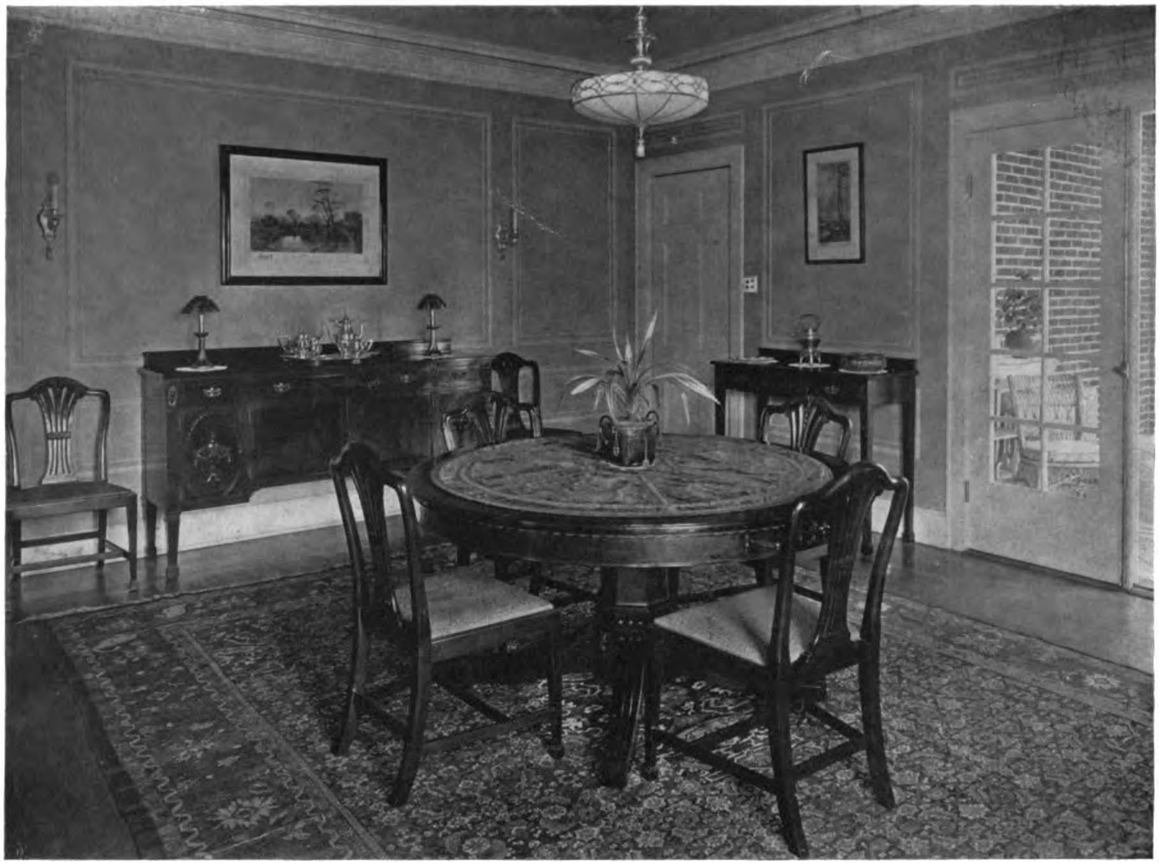


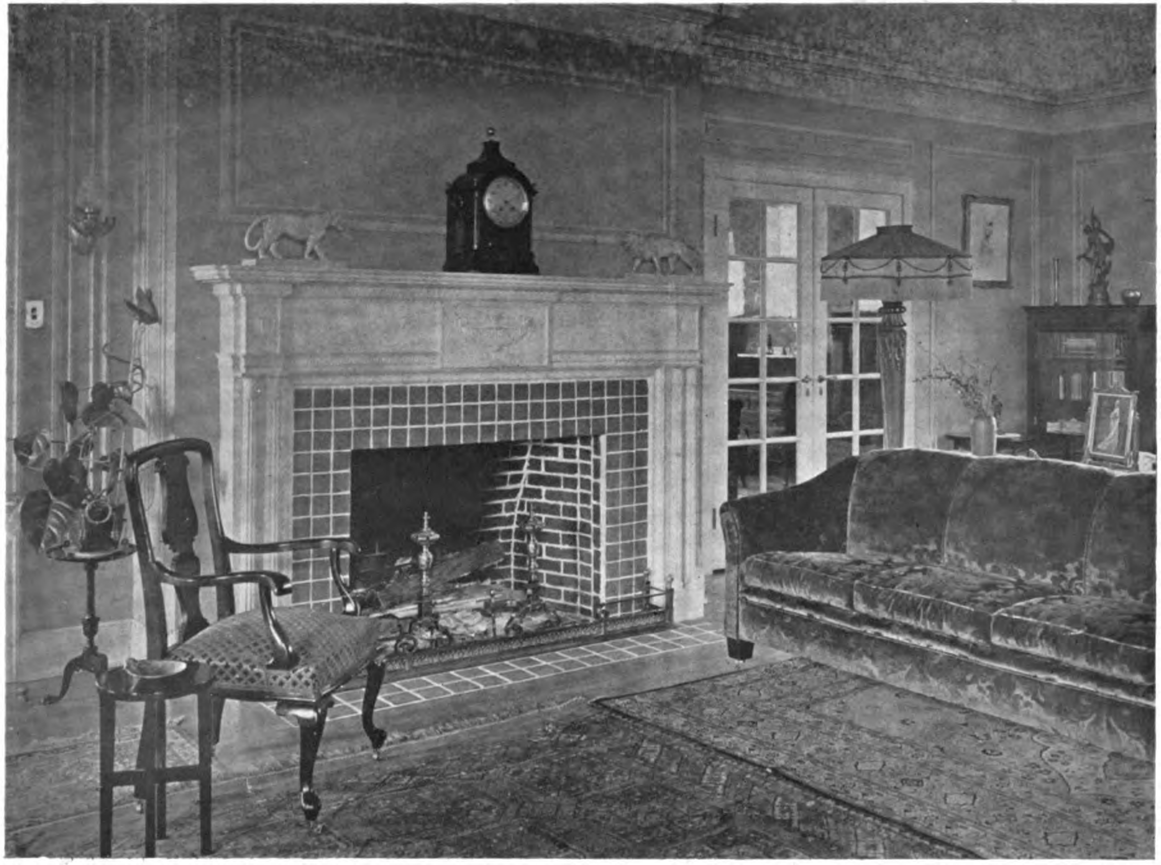


RESIDENCE OF MR. J. J. SCHULLINGER, FIELDSTON, RIVERDALE-ON-HUDSON, NEW YORK CITY.

Dwight James Baum, Architect.

ARCHITECTURE AND BUILDING. Plate 68.
Built by L. G. Barnhart; woodwork—Yerkes & Co.

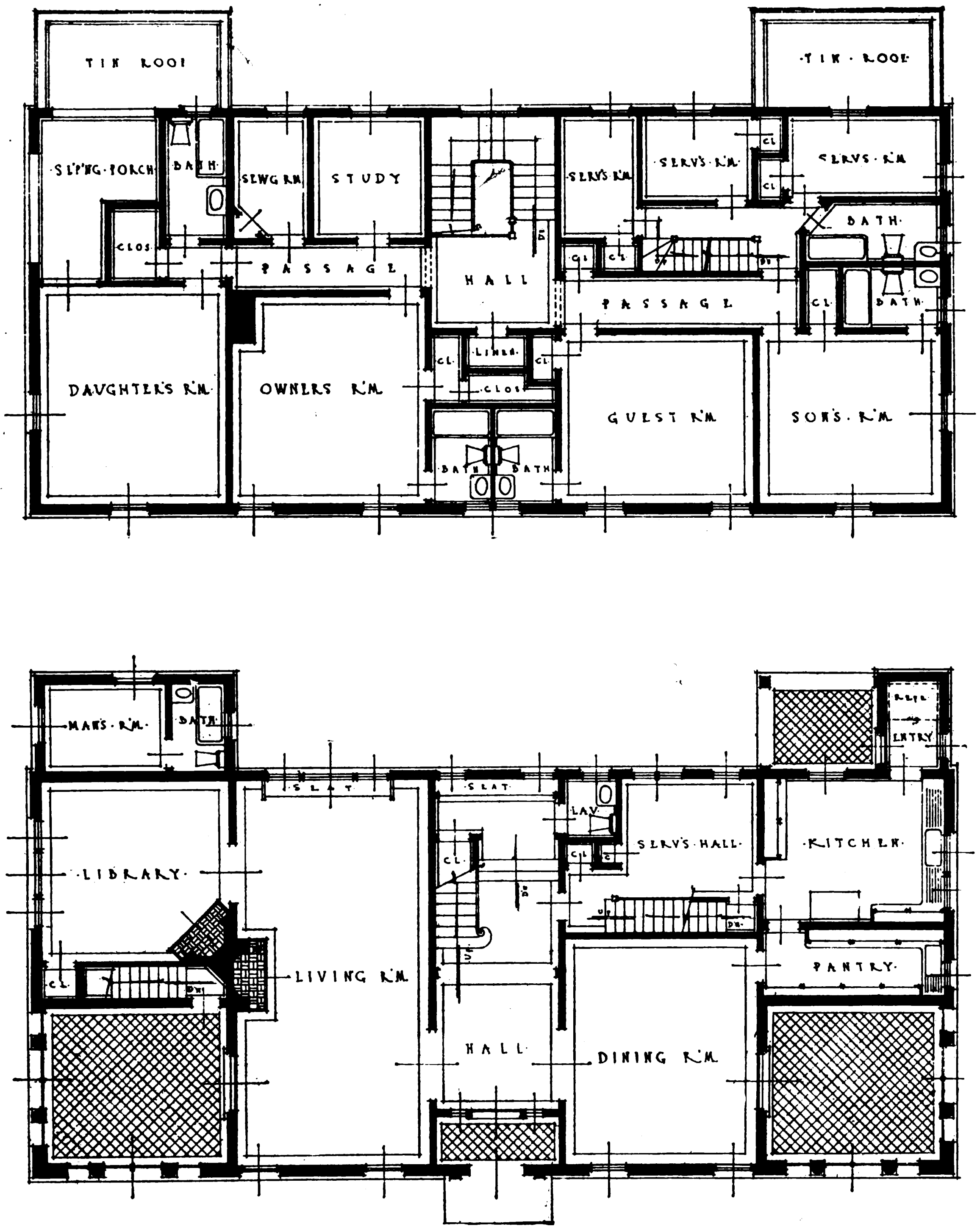




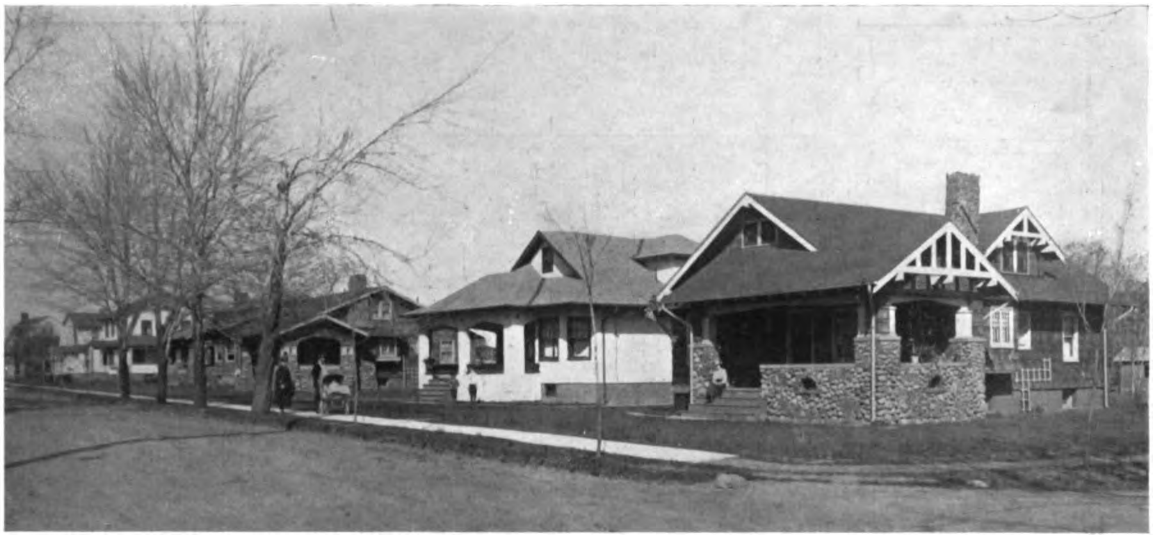
RESIDENCE OF MR. J. J. SCHULLINGER, FIELDSTON, RIVERDALE-ON-HUDSON, NEW YORK CITY.

Dwight James Baum, Architect.

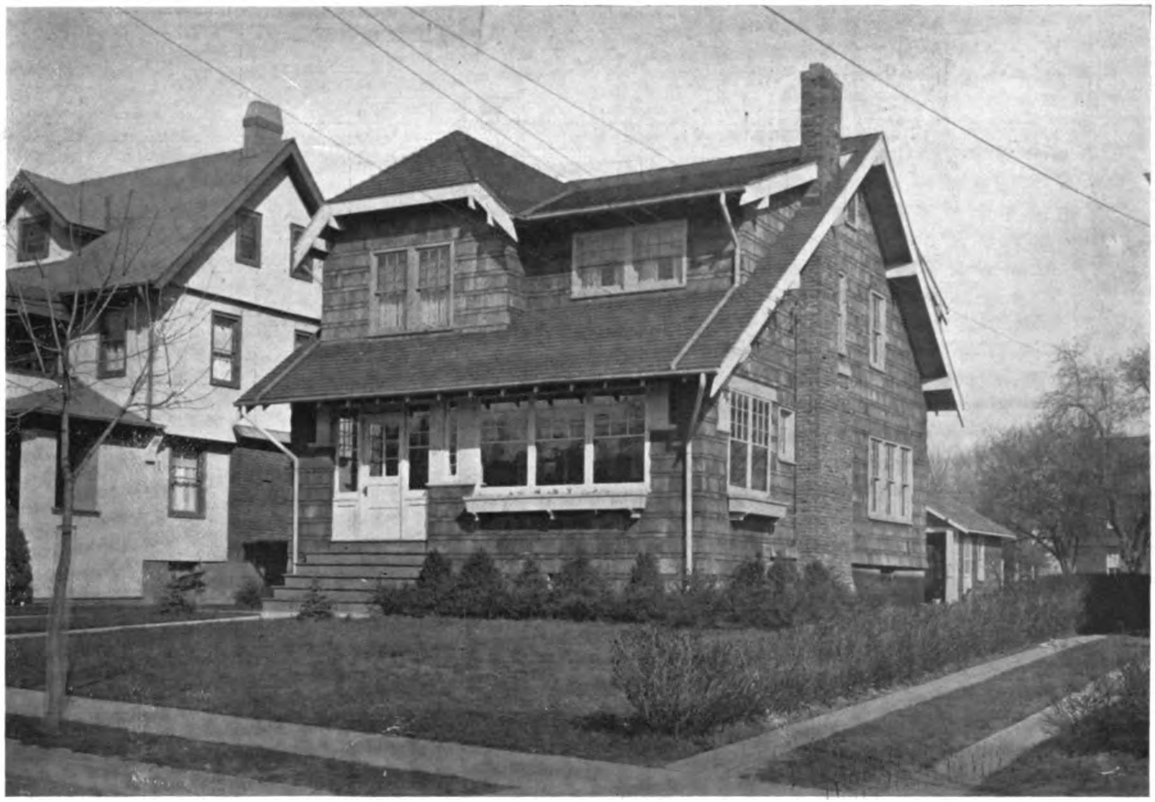
ARCHITECTURE AND BUILDING. Plate 69.
Built by L. G. Barnhart; woodwork—Yerkes & Co.



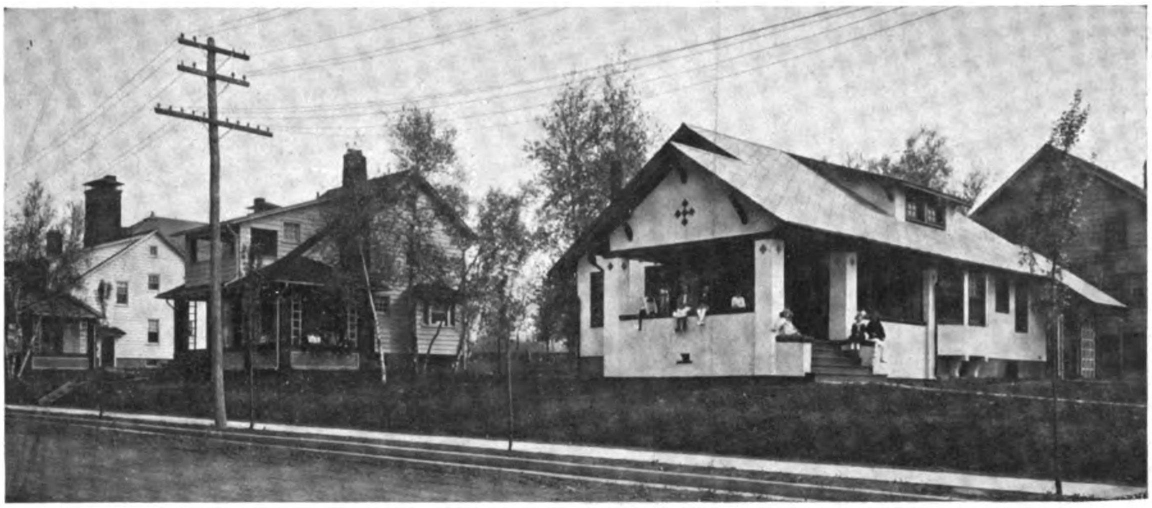
FIRST AND SECOND FLOOR PLANS, RESIDENCE OF MR. J. J. SCHULLINGER, FIELDSTON, RIVERDALE-ON-HUDSON, NEW YORK CITY.



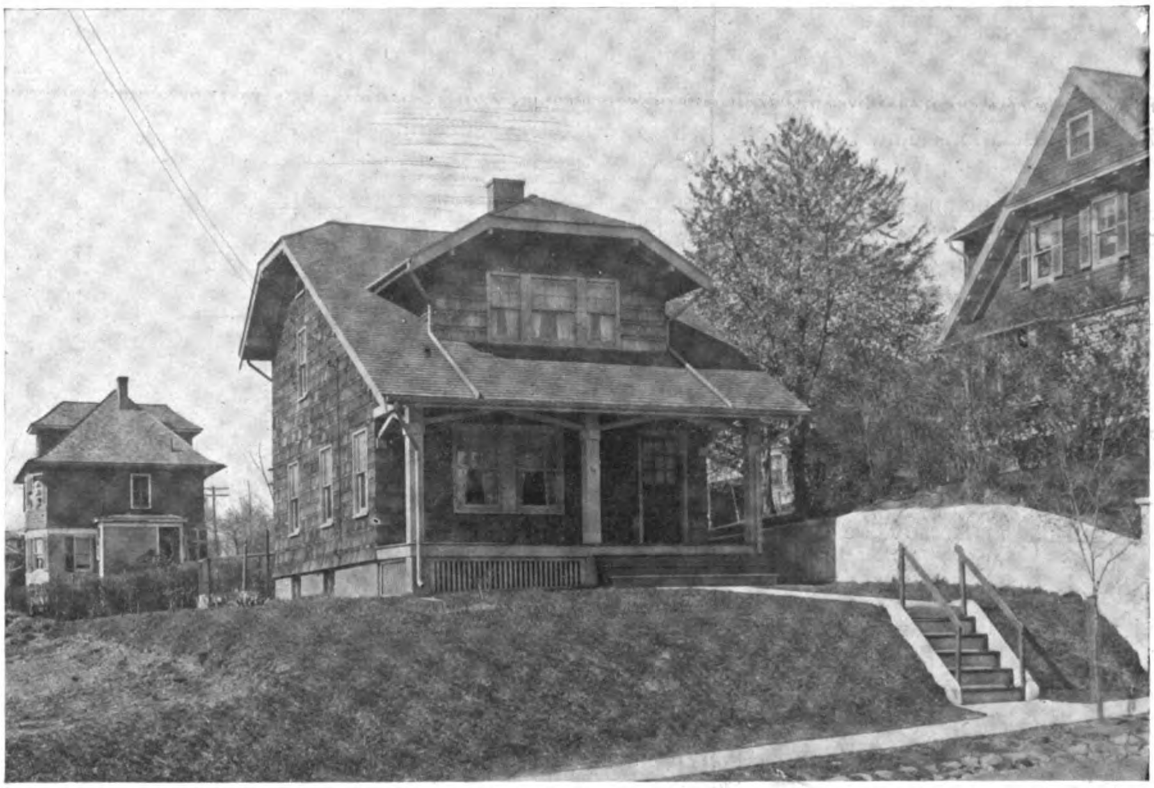
BUNGALOWS ON BLOOMFIELD AVENUE, NUTLEY, N. J.
William A. Lambert, Architect.



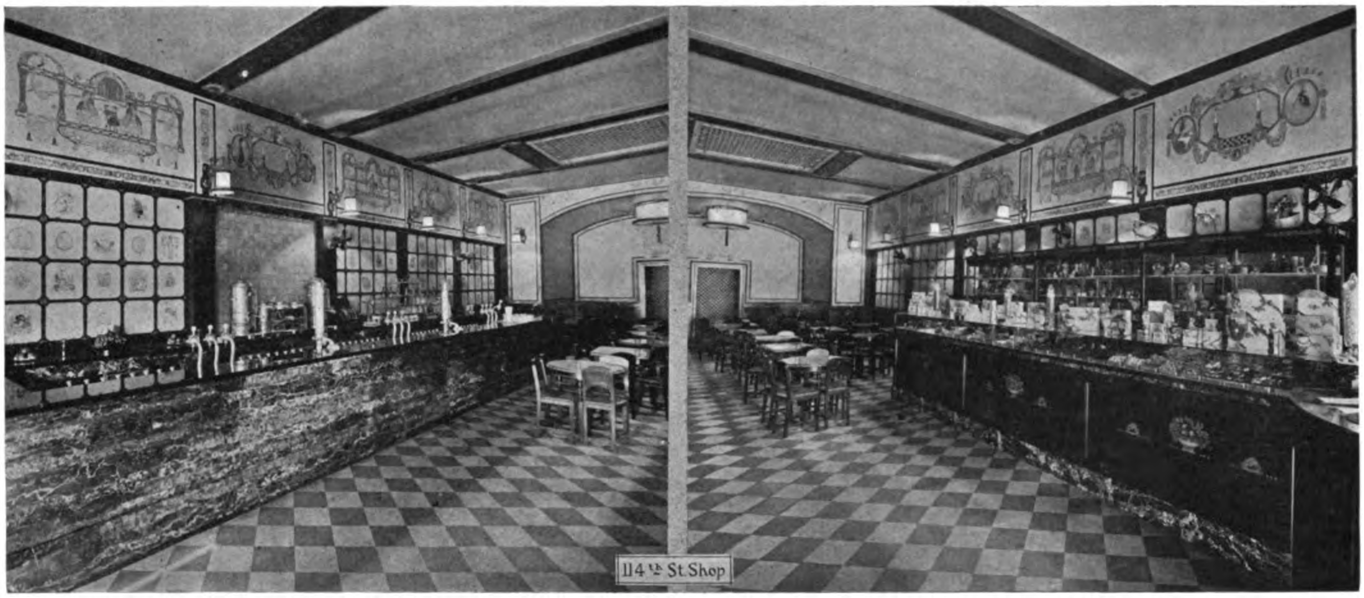
SEVEN-ROOM HOUSE ON HILLSIDE AVENUE, NUTLEY, N. J.
William A. Lambert, Architect.



RESIDENCES ON YANTACAW PLACE, NUTLEY, N. J.
William A. Lambert, Architect.



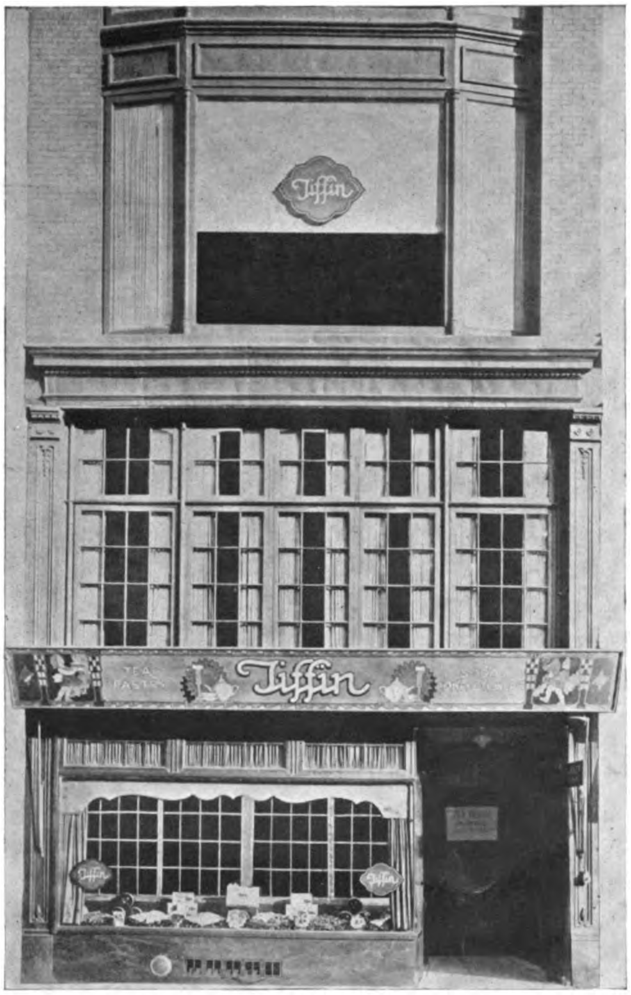
SIX-ROOM HOUSE ON HIGH STREET, NUTLEY, N. J.
William A. Lambert, Architect.



Tables and Chairs—The Reischmann Co.

TIFFIN SHOP.

The two illustrations show the exterior of the Tiffin Shop on Forty-second Street, between Sixth Avenue and Broadway, and an interior of another Tiffin shop located on Broadway near 114th Street. A characteristic decorative scheme is followed for these shops which marks them for their customers, a point which is a real asset for such a line of business which must depend on its reputation for attractiveness and service for its patronage. The designs show a studied appeal in every detail and though they are ephemeral the richness of the materials in which they are carried out removes any hint of the tawdry. The tile and marble interior with its frescoed panels and attractive illumination carries an air of nicety which aids the display of the products. The fountain counter on one side is offset by the candy counter on the other and there is ample table space at the rear.



ABOVE—TIFFIN SHOP, BROADWAY, NEAR 114TH STREET.
BELOW—TIFFIN SHOP, 105 WEST 42D STREET.
John J. Petit, Architect.

Architecture and Building. Plate 71.
42d Street Shop—Built by the North-Eastern Construction Co.; electrical contractors—Hudson Electric Engineering Co.; exterior marble—B. F. Reilly.

skeleton dial finely wrought in bronze, and the hands are of hollywood, delicately and minutely carved and finished in gold. The clock in the ladies' room is in keeping with its location. It is a very fine piece of work, with hands of pierced and engraved bronze. There are eighteen clocks in all which are operated on two circuits. The tile work was executed by William H. Jackson Co. Hyman Shatz did the painting. The mason contractors were the Fullam Construction Co., and the cement floors and walks were laid by Harrison and Meyer. The plumbing contractors were James McCullagh, Inc. The hollow metal windows were supplied by Lawton-Stephens Co., Inc., and the hollow metal doors and trim by The Empire Art Metal Co., Inc. T. New Construction Co. did the tile roofing and waterproofing. The toilet room appurtenances, supplies and holders were supplied by A. P. W. Paper Co.

THE HARLEM BRANCH, Y. W. C. A., NEW YORK

The new building stands at the corner of 124th Street and Lenox Avenue and replaces the old structure on the same site. It is primarily a staff house used for activities only.

This building of eight stories and basement is of fireproof construction, reinforced concrete having been used.

The educational floors of the building are open, bright and cheerful. The ventilation throughout of classrooms, clubrooms, and meeting rooms in connection with them, has been brought to the highest point of efficiency and from the point of hygiene and sanitation leaves nothing to be desired.

Special attention has been given to the planning of the physical department of the building. In the basement there is a swimming pool 21x60 feet, of the most modern construction and design. At the diving end the depth of water is 8 feet 6 inches, while at the shallow end the depth varies gradually from 3 feet 6 inches to 5 feet. A larger space than usual has been allowed for what might be termed the pool playground. The water is filtered and sterilized before reaching the pool, and the equipment provides almost continuous refiltering and sterilizing of the water while the pool is in use ensuring a body of water bright and clear and free from any source of contamination.

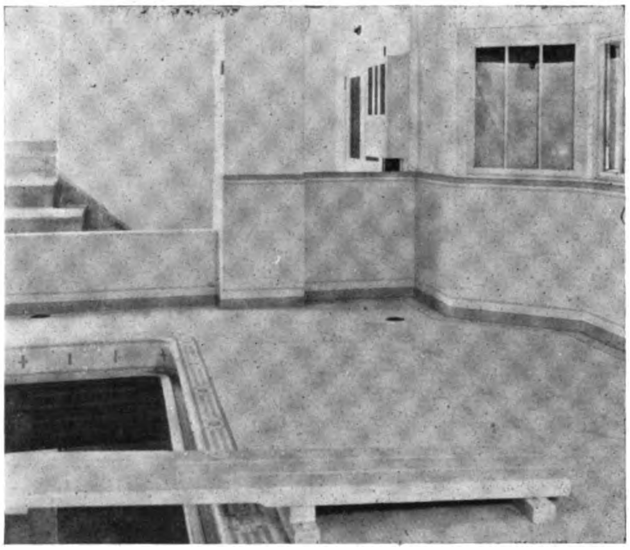
Adjoining the swimming pool is a large space devoted to showers and the dressing rooms connected with these for the girls. These showers and dressing rooms have been planned with a series of compartments so that girls taking showers on their way to the pool pass through what is called a dry aisle into the dressing compartment, thence through the shower compartment and directly to the pool. Girls in street clothes will not meet in any part of the dressing rooms with those in bathing suits or vice versa.

The gymnasium has been placed upon the top floor of the building, and so planned that it is constantly flooded with light. Its equipment will include every modern type of apparatus for the physical training of girls.

Adjoining the gymnasium and in close touch with the offices and examination rooms of the physical director and her assistants is located the shower room, with batteries of individual dressing compartments similar to those in the basement in connection with the pool, grouped around the shower spaces and so arranged as to maintain the maximum of privacy for girls using the showers.

The walls and floors of the natatorium, the pool and shower rooms are tiled with white tile throughout.

The cafeteria is a pleasing feature of the new building and embodies a few novel ideas. The tile floor, plain wall surfaces and simple furniture are relieved by a color note of blue and orange in the decorations. The service counter along the back of the room is placed behind a high permanent screen which obstructs the view of the service counter from the rest of the room. This is a feature worthy of note in that it adds to the privacy and tastefulness of the interior by separating it from the service. It is a decided improvement in cafeteria design in that it removes all view of the kitchen feature from the dining room. Both men and women are served in the cafeteria between the hours of 11:30 a. m. to 2.30 p. m. and 5.30 p. m. to 7.30 p. m. The capacity is 650 services a day and about 160 people may be served at one time. The average check is 50 cents.



ONE CORNER OF SWIMMING POOL, Y. W. C. A. BUILDING, 124TH STREET AND LENOX AVENUE, NEW YORK.
Tile work executed by Wm. H. Jackson Co.

As said before this is a building for activities only and with a membership of 2,500 girls the house is operated to capacity all of the time. There are reception and recreation rooms, class rooms and club rooms and a large auditorium. The activities include business training, domestic science, domestic arts, languages and trade courses. There are day and evening classes all at a low rate of tuition. A registry for investigated rooms in Harlem houses and apartments, and an employment department that places a large number of girls in positions are placed at the service of young women.

The building has all the appointments of a fine club house for women but provides no living accommodation. There are two residence buildings in the neighborhood, however, which meet this need. This building was erected by Tucker & Lewis. A. Perlman Iron Works did the ornamental iron work, and the plastering was done by D. McPherson. The paints used by George S. Hall Co., the painting contractors, were made by the Sherwin-Williams Co.

Book Reviews

THE BUILDING ESTIMATOR'S REFERENCE BOOK. By Frank R. Walker, Chicago, Frank R. Walker Co. Third edition, illustrated, 2831 pages, 4½x6½ inches. Price $10.00.

The existant condition of uncertainty of labor rates and material costs makes estimating today a most difficult problem and the only satisfactory basis for figuring is that of the man hour. From the man hour basis varied labor rates may be adjusted and comparison of figures on various jobs made. Material cost is a fixed figure readily obtained with sufficient accuracy from quantity estimates. A compilation of the figures obtained from these sources makes the most accurate data.

The building contractor and estimator engaged in computing the costs of our modern buildings must eliminate the item of guesswork from the estimates as far as possible.

This is not an easy matter, as building construction methods can hardly be reduced to the scientific basis of factories and shops, with their fixed surroundings and control of weather vagaries. When the many unforeseen conditions entering into the cost of modern buildings are taken into consideration this is readily seen—weather, rain, snow, cold, etc., all capable of causing inestimable damage and expense, not including the overhead charges for superintendence, etc., which must be paid regardless of weather conditions. A concrete mixer, hoisting engine, derrick, or some other piece of equipment may break, causing delays, overtime, or other unforeseen expense. These are all items over which the contractor or estimator has little control, and he must therefore use his best judgment as to costs and methods of construction.

The costs given in this book are from the best sources and are thoroughly reliable, as in most cases the author was on the work during construction and compiled all cost data during the progress of the work. In other cases it was obtained from the actual cost sheets coming in from the job each week and compiled at the completion of the work. No cost or data is included that the author is not convinced as being absolutely trustworthy so that the contractor and estimator may refer to it with perfect confidence.

The Third Edition of The Building Estimator's Reference Book has been thoroughly revised, so that no matter where the work is to be performed, the data is so arranged that local prices and wages may be inserted in all instances, resulting in unit costs that are thoroughly dependable.

The new book will prove to be more than a reference, as it is the author's intention to issue monthly supplements giving additional estimating data, together with current prices of the basic materials prevailing in our principal markets and trade centers, so that no matter how often prices fluctuate, they will be amply covered by our monthly supplements. This should prove of inestimable value to all concerned.

The division of the contents is as follows:

General conditions and overhead expense; excavating and back-filling, caissons, wood and concrete piles; concrete for footings and foundations, water and damp proofing; concrete floors, walks, street paving, etc.; reinforced concrete construction; brick masonry; rubble stone work, cut stone, granite, and architectural terra cotta; hollow tile fireproofing; rough carpentry, timber framing, flooring, lumber, etc.; mill work and interior finish, erection of same; lathing and plastering; cork insulation; sheet metal work, cornices, skylights, etc.; roofing; interior marble; interior tiling, floors, wainscoting, mantels, etc.; glass and glazing; painting and varnishing, and paper hanging; structural iron and steel.

In general summary of the book, it is particularly useful in the data given relative to reinforced concrete work and the detailed information on figuring form work. Throughout the book is filled with sound advice, caution and straight thinking.

BUILDING RECORDS ALL BROKEN.*

For some time it has been possible to forecast from the returns of the first few months of the year the probable building volume for the entire year. Each spring this becomes an absorbing item among those interested in building, and many figures are prepared indicating the probable extent of construction work for the whole year.

It happens that the building figures for the first three months during the years 1910 to 1919 inclusive have amounted on the average to 18.26 per cent. of the entire year's construction. If, therefore, we take this figure as about what may be expected from 1920 and consider that the total construction contracts reported by the F. W. Dodge Company for the first three months of 1920 represents 18.26 per cent. of what the entire year's work will bring forth, we may expect the reported figure of $780,408,000 to be expanded to $4,270,000,000 by December 31.

The magnitude of this total will be best appreciated when it is compared with building figures for preceding years. There have been only four years where the total has reached one billion dollars, and only one year where it has exceeded $1,700,000,000, the highest year completed being 1919, with $2,560,000,000. The other high spots of the past decade are as follows:

1918	$1,689,000,000
1917	1,618,000,000
1916	1,357,000,000
1915	940,000,000
1912	868,000,000

But it does not have to be emphasized that a million dollars of building today means far less than a million dollars of building meant five or ten years ago. Relative unit cost figures have been compiled, showing about how the comparison runs per unit bulk of building. And, to get a fair comparison with the 1920 program, it will be necessary to increase all the other figures up to 1920 prices. This means that the 1919 figures must be increased by about 7 per cent., 1918 figures by about 13 per cent., 1917 figures by 30 per cent., 1916 figures by 54 per cent., and previous years' by 80 per cent. Figured on the new basis, so that the amounts shown represent building volume and not merely depreciated dollars, we have the following comparison of building construction in the area east of the Missouri and north of the Ohio:

---

*By Morton C. Tuttle, Secretary, Aberthaw Construction Company, Boston, Mass.

	Estimated on 1920 Prices
1920	$4,270,000,000
1919	2,739,000,000
1918	1,909,000,000
1917	2,103,000,000
1916	2,090,000,000
1915	1,692,000,000
1912	1,562,000,000

It will be recognized that the figures immediately above have been corrected for all price differences, and that consequently they will represent the actual amount of building, all figured on the same unit costs which we are experiencing today.

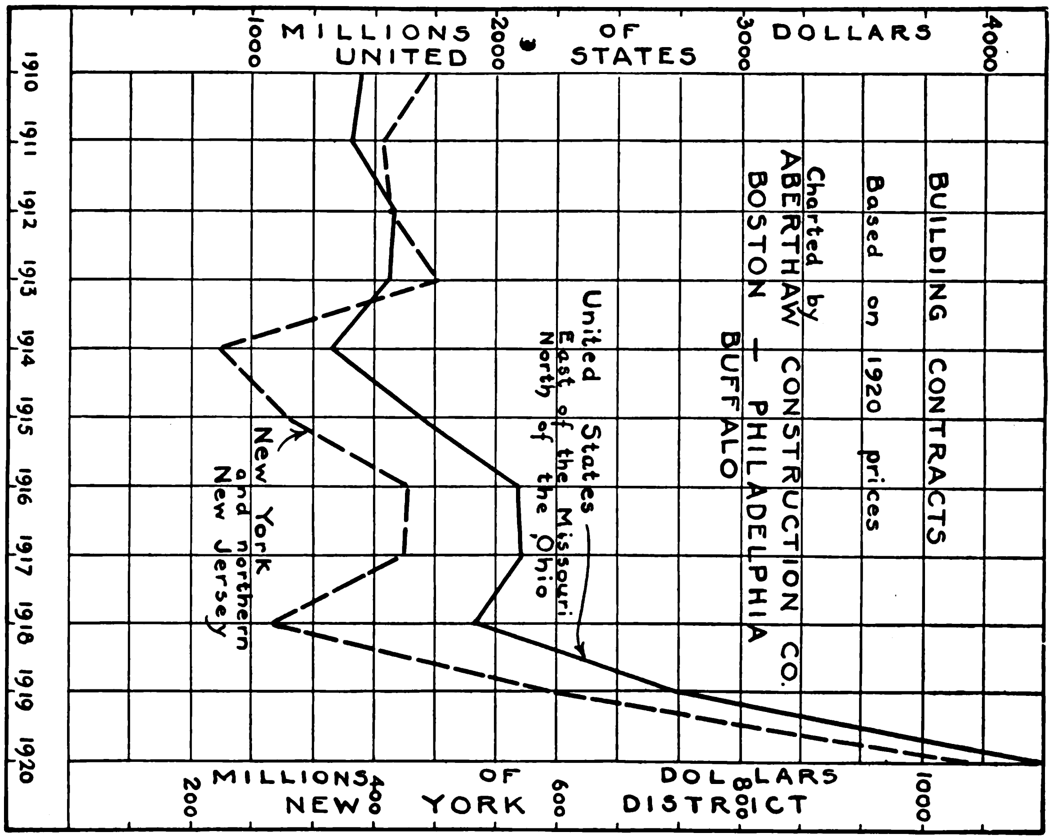
The completion during 1920 of the stupendous building program outlined above will depend upon a number of factors. The press dispatches tell us renewed strikes in Chicago have resulted in boosting the price of common building labor to one dollar per hour, and skilled labor to one dollar and twenty cents per hour. The same press dispatch tells us that, because of these exorbitant figures, fully fifty per cent. of the projected building construction in that city has been abandoned. Similar conditions throughout the country would cut hundreds of millions of dollars from the building operations which we might otherwise safely expect.

Even as it is owners are hesitating long before going to the high cost of building, unless the structure is so urgently needed that they find they can recoup its cost by profits within a short period. As prospective profits do not govern in residence construction, it is only natural that the building of dwellings should lag far behind that of industrial and commercial buildings, because the monetary return in the case of the residence is not so easily traceable, nor can the cost be repaid by business profits.

Thirty years ago the United States had about 110 families to every 100 residences. Three years ago the figure was about 115 families to every 100 residences; today it is more than 121. This points to heavy overcrowding in some sections, and to the substitution of apartments and two-family houses for the single houses of our forefathers. To get back to conditions of 1917, would require the construction in the United States of more than one million residences, and this without making any provision for expanding population. This means that the one million would be in addition to the normal annual requirements of nearly four hundred thousand per year to take care of increasing population.

Because of the conditions outlined above, much delay may be expected in making up this back work. On the other hand, large projects such as factories and commercial houses will go ahead, regardless of conditions, so long as the increased cost of building can be passed eventually to the "ultimate consumer."

In New York and Northern New Jersey the history of the past ten years of building shows that 17.41 per cent. of the total annual contracts were placed during the first three months of the year. As the 1920 contracts placed prior to April 1 amounted to $182,568,000, it would appear that, if 1920 is to follow its predeces-



sors, the total building volume expected may be placed at $1,049,000,000 for the year. This compares with $551,000,000 in 1919, which was the previous best year; $333,000,000 in 1917, and less than $300,000,000 in all other years.

Obviously, it would be unfair to use these comparative figures without due reference to the present enhanced cost of building. If, therefore, we refigure the building programs of previous years on the basis of this year's prices we find the following results:

1920 (estimated)	$1,049,000,000	(24.5% of the total)
1919	590,000,000	(21.5% of the total)
1918	290,000,000	(15.2% of the total)
1917	433,000,000	(20.6% of the total)
1916	437,000,000	(20.9% of the total)
1915	306,000,000	(18.1% of the total)
1913	470,000,000	(30.4% of the total)
1910	459,000,000	(31.6% of the total)

New York is evidently not holding her primacy of the first ten years of the decade, when 30 per cent. of the building construction was hers. But this year's 24.5 per cent. compares favorably with the 20 per cent. of the past five years, and represents a building bulk greater than the sum of the two largest previous years in her history.

PROPOSED REMEDIES FOR LABOR SHORTAGE.

Practical measures to relieve the present labor shortage were proposed by the National Immigration Conference held on April 7 in New York City. This gathering included leaders in finance, industry and agriculture, together with labor men and representatives of foreign born groups in America, and was called by the Interracial Council, 120 Broadway.

The common interests which drew these varied elements together is the need of greater production, more stable labor conditions and a better understanding between the different races living in America. In other words, better team work is essential today. Americans and immigrants should learn to pull together for the benefit of all.

Among the measures proposed were greater protection for the immigrant against fraud, extortion and violence. A Federal Assimilation Bureau should be established to look after the welfare of the immigrant, help him learn our language and place him where he can work to the best advantage of himself and the nation. Standards for citizenship should be high, but useless hindrances and red tape should be done away with. An advanced immigration policy was advocated as a remedy for the present labor shortage, including the selection of industrious and thrifty men and women of good character, and their distribution to the points where they can do the work for which they are fitted. As an immigrant may be of great value to the country as an unskilled laborer, regardless of his inability to read, it was urged that the present literacy test be eliminated and this would open the gates to unskilled workers in agriculture and industry, construction, railroads and domestic service, where there is a great need for help at this time. Our present labor shortage is estimated at between 4,000,000 and 5,000,000, and this would be relieved by a policy of admitting immigrants without book learning, but of good character, sound body and mind and the Old World habits of frugality and industry.

It is encouraging to note that there is an upward trend to immigration. In one week recently 9,000 aliens arrived at Ellis Island, New York. An increase in the number is said largely to be a problem of shipping. As the world tonnage increases we may look to see a steady increase of immigration from European ports.

Current Notes

KILN DRYING.

The Forest Products Laboratory at Madison, Wis., has opened a course in kiln drying.

The course consists of ten full days instruction in kiln drying under a staff of competent specialists, and is of particular value to superintendents, lumber and production men, and kiln foremen of wood-using industries. To cover the cost of conducting the course, a cooperative fee of $100 per man is charged.

A brief outline of the course is as follows:

Actual operation of special kiln runs on 4/4 and 8/4 green oak.

Methods of preventing checking, casehardening, warping, and other seasoning defects.

Proper regulation of temperature, humidity, and circulation in the dry kiln.

Use of instruments and apparatus for controlling temperature and humidity in the dry kiln or in the wood shop.

Advantages and disadvantages of different types of kilns.

Drying of veneers and plywood.

Inspection trip to near-by city to observe large scale commercial drying or heavy green hardwoods (round trip, $1.00).

Selection and identification of woods.

Individual conferences as to particular problems or difficulties in kiln drying.

ADVERTISING AND EXPANSION.

In November, 1918, The Refinite Company, of Omaha, was possessed of a name, a natural mineral that changes hard water into soft water and a modest capital.

Six months later sales were going at the rate of $1,000,000 per annum, and exactly twelve months after the signing of the Armistice the business was progressing at the rate of $2,000,000 a year and growing so fast as to be really uncomfortable.

This result has been accomplished almost entirely through the sales and advertising campaign planned and carried out by W. W. Turner, general manager of the company.

The commercial advantages of water softening could be so easily demonstrated that this field was approached first. Laundries are naturally the best customers and in them it was always easy to make a demonstration of the saving in soap and chemicals. Soft water however is a great advantage in almost every field of industrial activity as well as for household use. It means better working conditions and less operating expense.

What does the term soft water mean is a natural

(Continued on page 20—Adv.)

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Plain and
Ornamental Plastering
WINFIELD, L. I.

(Continued from page 62—Text)

question. The old rain barrel gave soft water to the farmer's wife and what was it? Rain water is water distilled by natural processes; it contains no soluble salts; it is ready to absorb them and in that lies its value. The well water was generally full of soluble salts and called hard water. If the salts in solution in most water supplies are removed or neutralized soft water is the result. The "Refinite" process does this efficiently at low cost. It is one of the steps in modern progress which is rapidly coming into its own.

A JAPANESE CATALOGUE.

An interesting side light on the development of foreign markets, by progressive American manufacturers is furnished by a catalogue, issued by the General Commercial Company, Ltd., Yokohama, Japanese agents of the Wright Manufacturing Company of Lisbon, Ohio. Their product consists of hoists only, and the catalogue in question is printed in Japanese. Mr. Wright is authority for the statement that in foreign countries there is a distinct tendency to favor those American manufacturers who specialize in one product.

At the annual convention of the New York Society of Architects held at the United Engineering Society Building on May 19, James Riely Gordon was unanimously re-elected for the fifth consecutive term as president; Adam E. Fisher, of Brooklyn, first vice-president; Edward W. Loth, of Albany, second vice-president; Frederick C. Zobel, of New York, secretary; Henry Holder, of Brooklyn, treasurer, and Walter H. Volckening, of New York, financial secretary.

The seriousness of the building, housing and labor situations were discussed at length. Many committees reported and many others were appointed to investigate these conditions.

On April 19, following his re-election as a member of the Board of Directors at the annual meeting of the stockholders of the Joseph Dixon Crucible Company, Mr. George E. Long announced his decision to retire from the office of vice-president. Thereby he terminates forty-three years of active and valuable service with this company, beginning in the capacity of a stenographer and advancing to the offices of secretary, treasurer and vice-president, respectively.

It would be difficult to enumerate in detail the contributions that Mr. Long has made toward the wonderful growth of the Dixon Company's business during his service of forty-three years. In a much wider sphere than the Dixon family circle, Mr. Long is recognized as the "Daddy" of Graphite Lubrication, and as the "Father" of Silica-Graphite paint for protective purposes. Similarly in advertising circles he has been recognized for many years, as he has been an ardent advocate at all times of ample publicity or advertising to inform possible users of the Dixon products in their wide variety.

In the May issue of ARCHITECTURE AND BUILDING illustrating the Fox Film Corporation's new Building at 55th street and Tenth avenue, New York City, we gave exclusive credit to William Fried as the architect. Carlson & Wiseman, Architects, of 226 Henry street, Brooklyn, were associated with Mr. Fried on this building.

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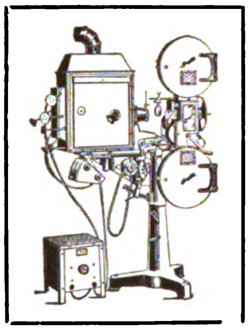

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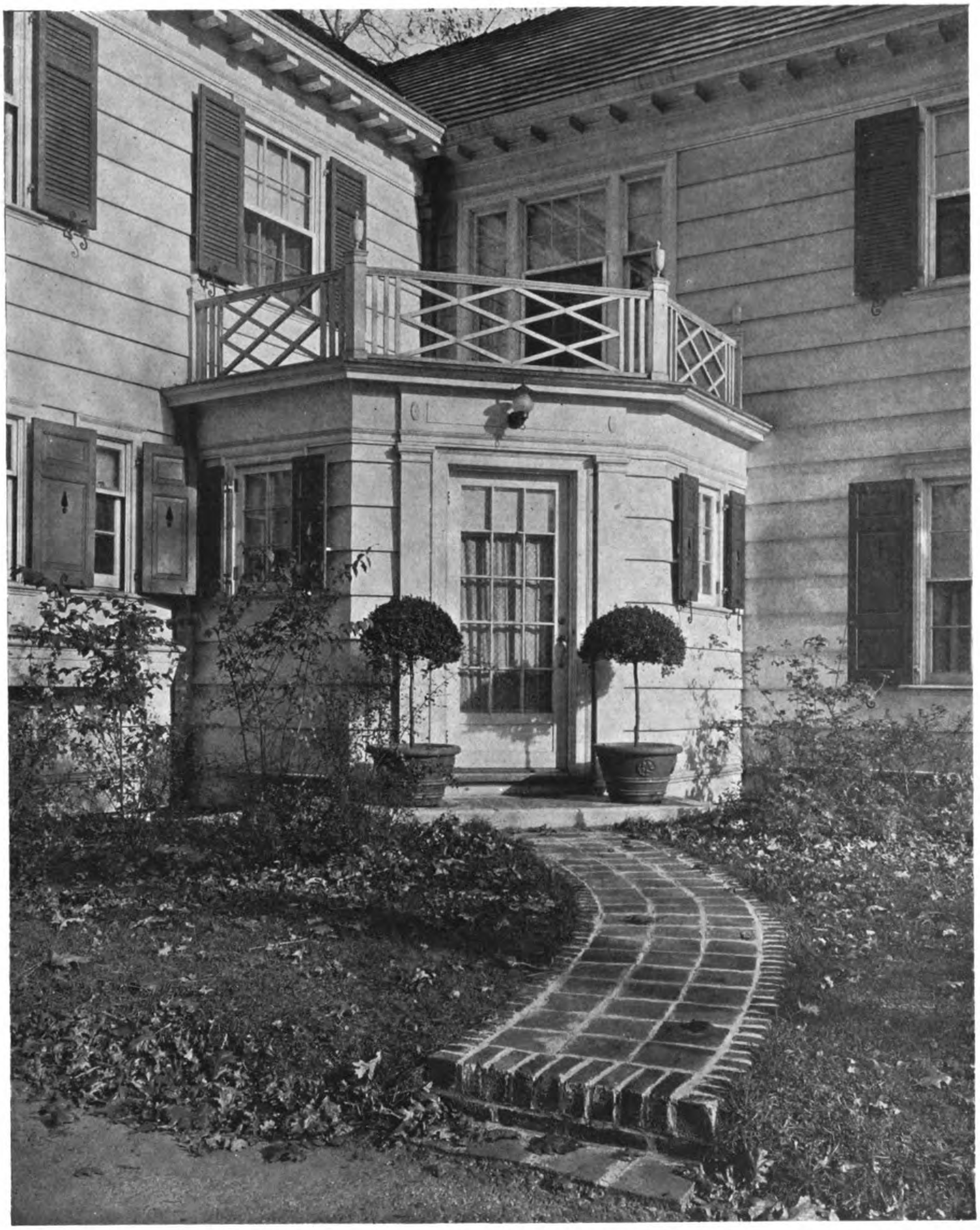


DETAIL OF ENTRANCE, RESIDENCE OF MR. DWIGHT. JAMES BAUM, ARCHITECT.
Riverdale-on-Hudson, New York City.

ARCHITECTURE AND BUILDING

A Magazine Devoted to Contemporary Architectural Construction

WILLIAM P. COMSTOCK
Managing Editor

Volume LII JULY, 1920 Number 7

DESIGN IN THE INDUSTRIAL ARTS. WHERE DO THE MUSEUMS STAND.*

It is the general assumption in some quarters that design does not exist in American industrial arts; we must, therefore, I fear, attack our subject in a purely abstract way, and ignore such design as we are perforce obliged to accept in purchasing drawing room chairs, desk lamps, table silver, wall paper, jewelry, rugs or millinery. We would be in much the same position as the lady who saw the figure of Agassiz plunged head first into a pavement at the time of the San Francisco earthquake: She had always thought of the naturalist in the abstract, but never in the concrete! Yet the facts are there; when we stumble over a chair in the dark we think of design in the concrete. Let us, therefore, consider some of the aspects of design—in whatever degree it may be admitted to exist or to be devoutly hoped for.

First, who has use for design in industrial arts manufacture? We all know the craftsman and his enviable pleasure in the contact with materials and their individual expressions; he has need for design, working it out by personal touch, making only a limited number of pieces in his lifetime, but striking his own keynote in each. Him we have in a sense inherited, for he seems strangely out of place in a deafening racket of mills and foundries. Yet without him all the machines man can devise will lose value; he gives tone to industrial art; his work after all is the index of accomplishment. May his tribe increase.

Then there is the designer, the generally oppressed individual who makes only drawings and conceives them all from the standpoint of what can be run off by machine. He thinks in quantities of yards or pieces; he is harnessed to the chariot of business, for he can design only what will sell. He is under the imperial thumb of the boss who pays his salary, which, with the exception of the field of women's clothing, is comparable with the now proverbial mite which is given to teachers throughout our land with the suggestion that they take out the rest of their remuneration in personal satisfaction in their work. The designer is owned by the manufacturer.

Then there is the manufacturer himself, in most cases a well meaning soul, in many cases an understanding business man with a feeling for good things in art, in many more cases a person that should be selling hemp rope or plumbing fixtures. The manufacturer who has seen the light and is convinced that design sells, often makes mistakes, because he tries to make things too well. If he is also engaged in retail selling his road is clear and of such is the Kingdom of Heaven in our industrial arts. But the great majority of manufacturers sell only to middlemen, to dealers or distributors, whose appreciation of design in manufacture is measured by the difference between the wholesale and retail prices. His mind is a cash register; garish carving catches the eye of a gullible public more readily than the chaste line of unadorned wood. The dealer is the Cerberus at the gates of our industrial art; he buys from the manufacturer, he sells to us; hence the manufacturer will make only what the dealer will buy and between the two the public is held fast and mulcted—especially since our schools and colleges do not help us toward a standard of judgment and taste in the selection of our home furnishings and personal adornments.

Finally, there are the artisans and operatives; these use design in the industrial arts in a purely objective way. As a whole they know little of design, except as there may be found among them some few who have felt stirring within them the spark of craftsmanship. If they have had this blessing they are usually too poor to profit by it, having to count on a living made by the machine. In general they are but skilled laborers of the better class. The words themselves are an affront to the ideals of the craftsman as he was known once upon a time; every skilled laborer really should be a craftsman—were that the case our labor troubles would soon cease. For the ideals of the craftsman can be made operative, even though the man himself works on the machine.

And now, what are the characteristics of modern design in the industrial arts, the controlling factors? First we have mass production, the machine and its many evils and benefits. We are a numerous people; we all need many things each year that fall within the description of industrial arts. Very few of us can afford to engage a manual craftsman. The machine is the only agency that will bring the things we want and need within reach of our pocketbooks. The problem then is not shall we keep the machine or not; it is how can we improve the product of the machine to the point where it will do least damage to our national standards of good taste. Any agency for business profit which has assumed the proportions of importance now so long maintained by machine manufacture cannot be uprooted. Let us, therefore, regard it as an agency for good, and make it do its work. It is not an automaton; it is a dead mechanism, and it will do our bidding, differing only in degree from the merest mallet or needle. The machine is a complicated tool. There is a screw driver which does not require torsion of the wrist; even though it was a new-fangled affair, workmen stopped only at the price, the instrument itself at once appealed. Now a carpenter's kit is incomplete without it. There is but a small degree of difference between the plain screw driver and the improved descendant, and it is but one step further to the power driven screw driver. By comparison it will be found that all the looms with their infinitely complicated parts are but derivatives from the simplest handloom. Obviously, if the machine is left to do its own work it will turn out a mechanical job; again if we limit our design to what the machine in question can do, we must make a purely mechanical design. But why stop at that? I firmly believe that there is no limit whatever to the possibilities of the machine.

---

* By Richard F. Bach, Associate in Industrial Arts, Metropolitan Museum of Art.

if only we will regard it as a tool, always mastering it and improving it.

We have mentioned the difficulties of the designer who works always for the machine and who, therefore, in many cases must hamper his ability in order to earn his weekly wage. Assuming that he has made something good—especially if he is a free lance whose work has been bought by a well-meaning firm—his drawing must go through a number of processes, very similar to those visited upon the playwright's manuscript on its way to the stage, before the machines are set in motion to produce it. There is to be considered the machine itself and its possibilities, the market, the character of goods it is intended to produce, the quantity which can profitably be made. Possibly the colors may be entirely changed, often without enough thought, because of difficulties with dyes; possibly important lines in the composition may disappear because it means too much work in cutting rollers, in the case of printed textiles, for instance. These are some of the vagaries of the design before we can purchase it at a department store.

And again, we have the manufacturer-dealer-public problem already referred to, the ever present difficulty of laying the ghost of "what the public wants." Peace be to its ashes—what the public can get is an accurate translation.

It would be proper now to say, how can all these conditions be changed? That attitude should be forever discarded. Conditions are indications of growth and growth must be guided. We must, therefore, seek ways of improving conditions which now seem to us wrong, so that this growth may consist of firm roots, strong trunk and heavy leafage, the whole being the tree of American design.

Primarily we must have schools, everlastingly and in numbers: schools of design for all the industrial arts situated in their respective territories with regard to production; also industrial arts teaching in the general schools, teaching of industrial arts appreciation in all the schools, not omitting colleges—all of this instead of meaningless and aimless drawing without objective in actual execution. We would make no greater effort to make furniture or textile craftsmen or designers than now we try to make painters by teaching drawing. Some of the colleges give us history and theory of fine arts, cultural subjects to be sure, and necessary to the complete adult; yet that adult who can reel off names of painters of the French Romantic school will surround himself with atrocious furniture. There lies an enormous field for improvement—and we must catch them young.

But until we have the schools, we must use the most important agency now available, namely, the art and other museums. All museums can help in this direction, though, of course, the burden falls chiefly upon the art museums. And at that, only some ten or twelve per cent. of the museums in the United States are art museums—how many of these have any industrial arts collections it is too painful to consider. The museum is gradually coming to its own as an educational institution; it is slowly coming to a proper view of its functions. The days when preservation and delectation were the main purposes of an art museum are happily past. But half the work of an art museum is collecting and preserving and exhibiting; the other half consists of exploiting its possessions for the public good. Make the galleries work is the slogan at the Metropolitan Museum of Art; a special department being maintained to reach the industrial arts field itself. As a culmination of the year's work in this direction an exhibition is held in which an effort is made to prove the practical or trade value of museum collections in current production. In 1919 over eighty exhibitors lent over four hundred pieces, from rugs to jewelry, from embroidery to leatherwork, for this exhibition, all objects taken out of stock; this despite the usual difficulties, such as fear of having designs pirated, hampering of sales, etc. The spirit of cooperation on the part of so many designers and manufacturers amply indicates the value of museum service to this field of production. An exhibition is now open to the public, an even better, though smaller, record of what can be done when the art museum is used as a laboratory, an adjunct of the factory or designing room.

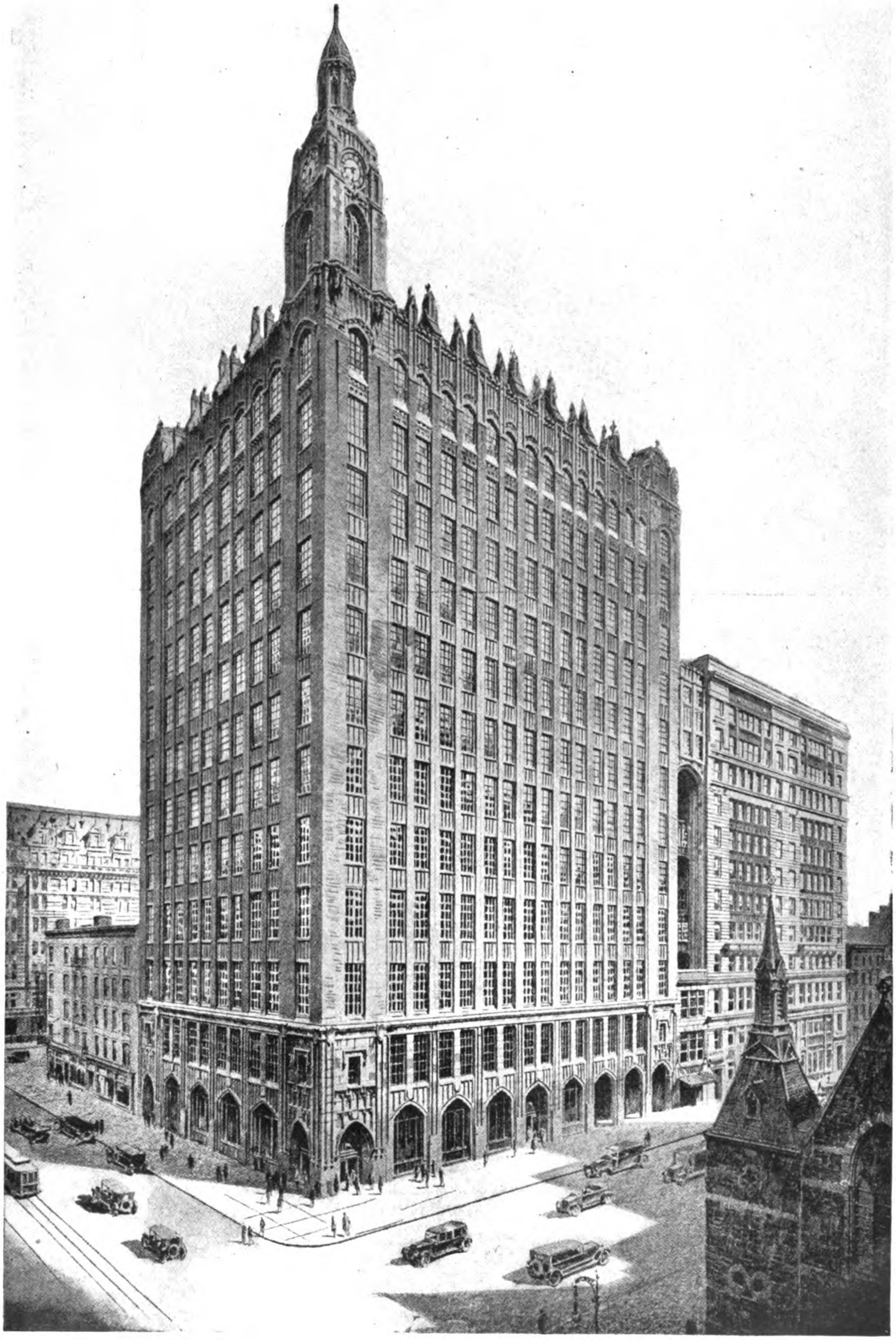
The exhibits are of many kinds and types of design, the whole gamut of the styles of history being shown, and fortunately so, for only upon such catholicity of style use can we build our own progress. No single manifestation of art of long ago can now be held up as the sole source of all inspiration for the present. The only real source for the present is the present, but the workmanship, the motives, the designs and colors and contours must be studies in the expressions of the past, so that they may help us to tell the story of the present. Museums can help in this direction as nothing else in American life can. Our art museums are bound to become collectively the real sources of inspiration for modern industrial art in our country, and the Metropolitan Museum, having taken the lead in this direction, may claim the title of the workbench of American taste.

The use of an object of art from an inspirational viewpoint is very much like the use of a book for study. The same volume may offer untold riches to one student and remain cold and blank to another. An Italian gesso-covered and painted picture frame may seem a long cry from the modern market, yet it has been studied by a New York manufacturer of tapestries. An Athenian vessel twenty centuries old has been passed by thousands of visitors until a designer of commercial containers saw in this as in nothing else that had come to her notice a possibility for a modern jar to hold cosmetics. A millefleurs tapestry remained the despair of scores of artists and designers until a manufacturer of rugs determined to take advantage of this design for the improvement of American rugs. A designer of dress fabrics saw possibilities in the armor collection. A china painter studied Russian laces. Embroidered crests assisted in the design of American sport skirts. A paper soap wrapper design saw its beginnings in snuff boxes.

These are a few of the actual cases of recent weeks, all showing that in tracing fundamentals of design the manufacturer or his designer seeks his inspiration wherever it may be found and the differences of material, style, artist, period, race, or purpose are not considered barriers. Thus they have at their command the entire field of industrial art design of all ages, and their only limitation is that they shall properly express in terms of their own materials the design and purposes of the pieces which they themselves are producing.

And all of these uses of the collections are duplicated in the use of the library and of the photograph collection, and again in the use made of purchased photographs. The Museum sells annually no less than sixty-five thousand photographic prints, all of which serve students' or designers' purposes.

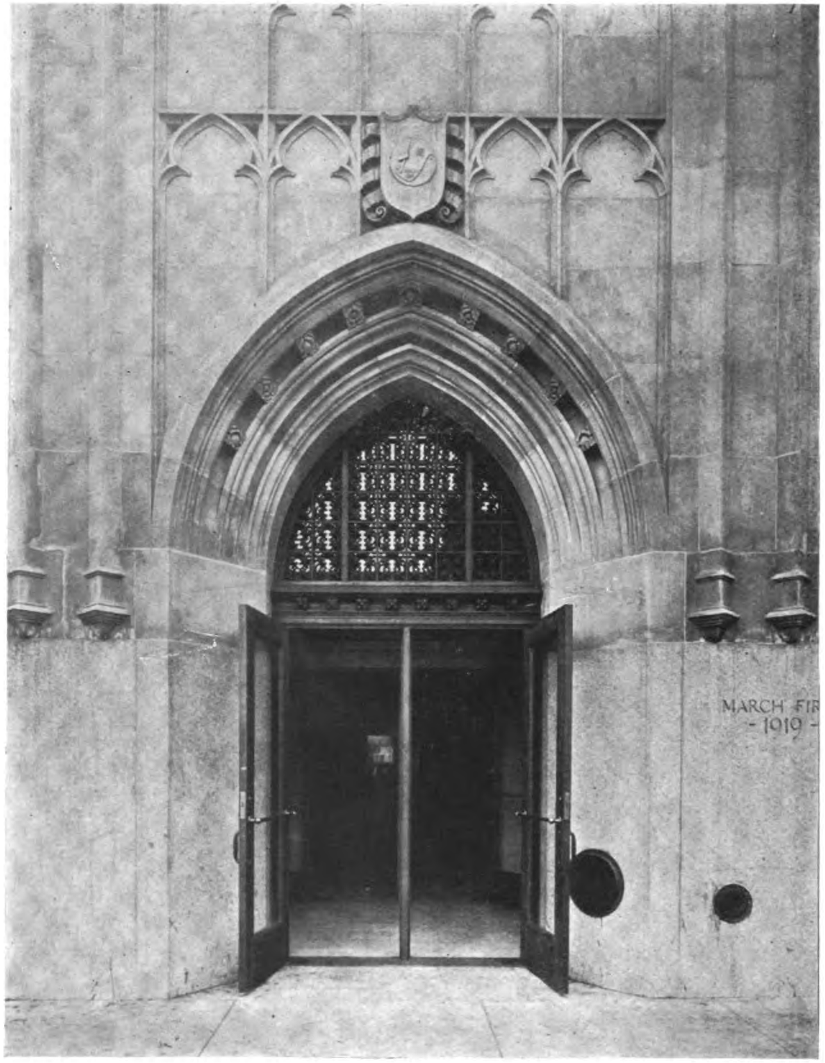
Then there is the direct line of inspiration which remains a constant source of assured refreshment, having stood the test of age-long examination; that is, the use of furniture collections by furniture designers and manufacturers, or of the textile collections by textile manufacturers.



PICTORIAL REVIEW BUILDING, 39TH STREET AND 7TH AVENUE, NEW YORK.

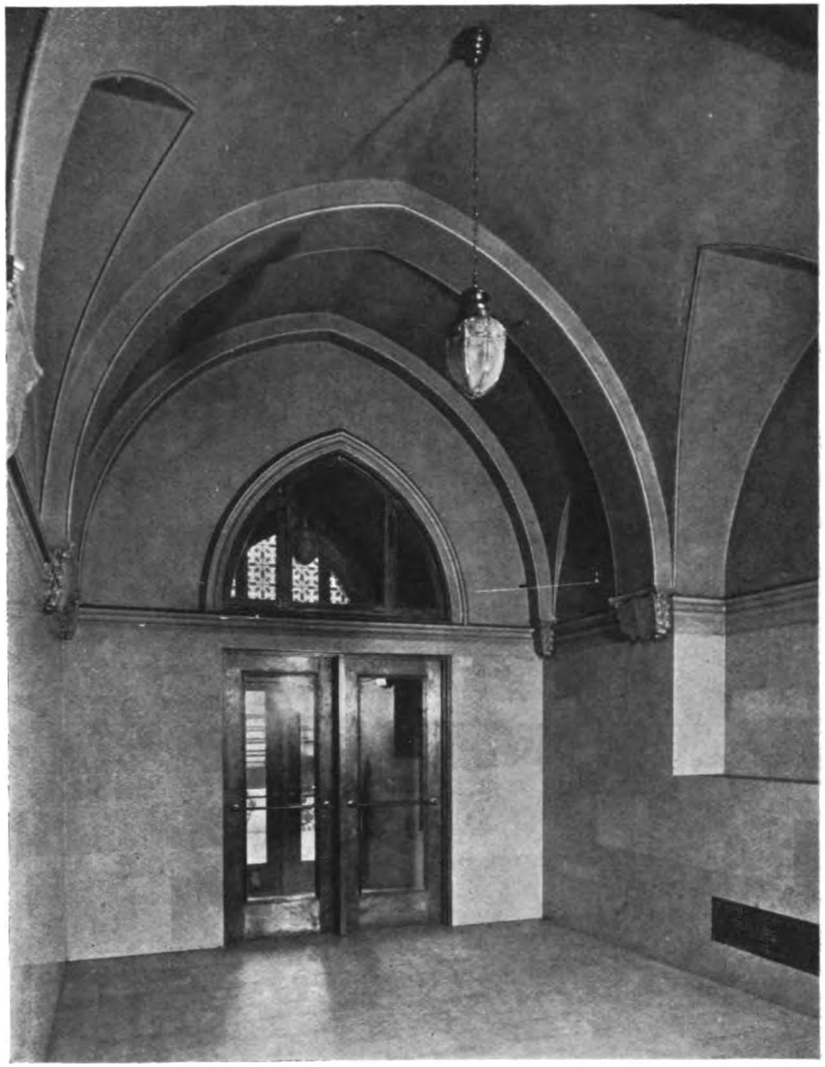
Renwick, Aspinwall & Tucker. Architects

ARCHITECTURE AND BUILDING. Plate 72.
Built by G. B. Beaumont & Co.; terra cotta work—Federal Terra Cotta Co.; toilet partitions—Betz Bros.; plumbing and heating—W. G. Cornell Company.
A. B. See elevators installed.



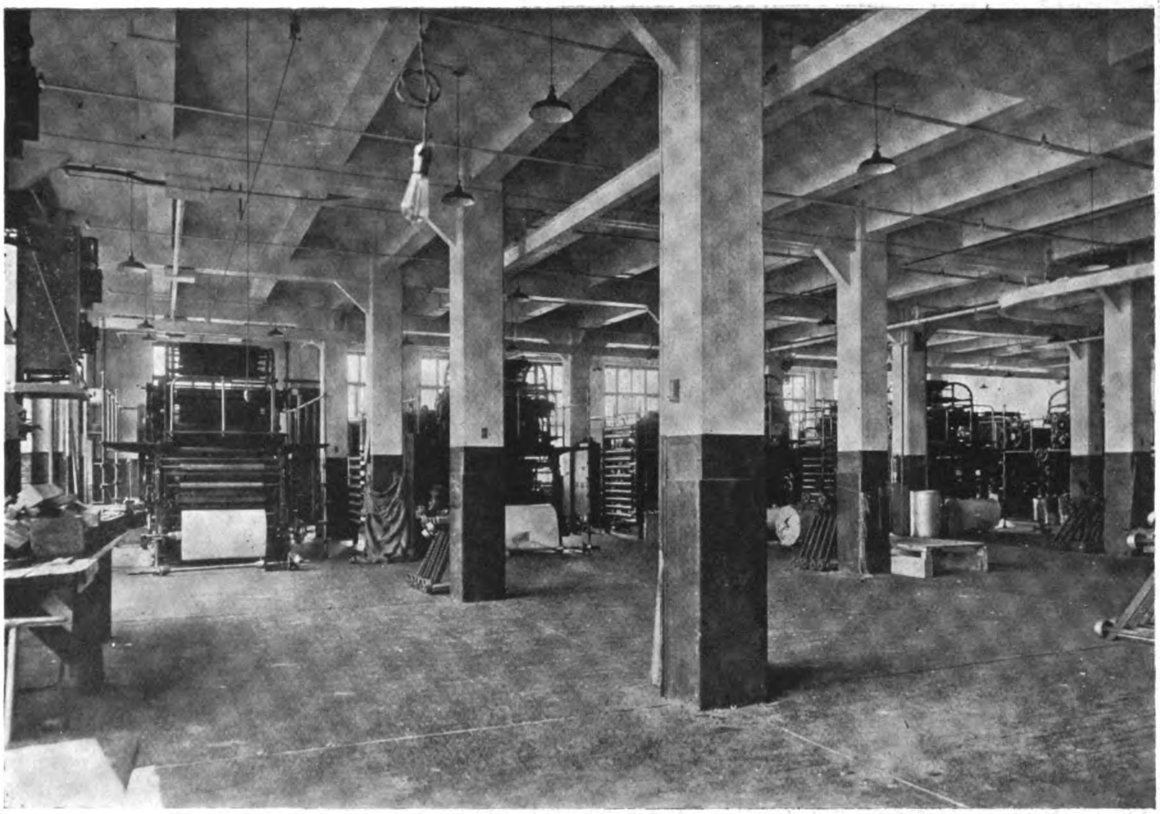
DETAIL OF ENTRANCE

ARCHITECTURE AND BUILDING. Plate 73.
Built by G. B. Beaumont & Co.; painting—W. P. Nelson Co.; interior marble and tile—Friedman Marble & Slate Works, Inc.; kalamein, bronze covered entrance and vestibule doors—Reliance Fireproof Door Company; "Barreled Sunlight" paint made by U. S. Gutta Percha Paint Co.

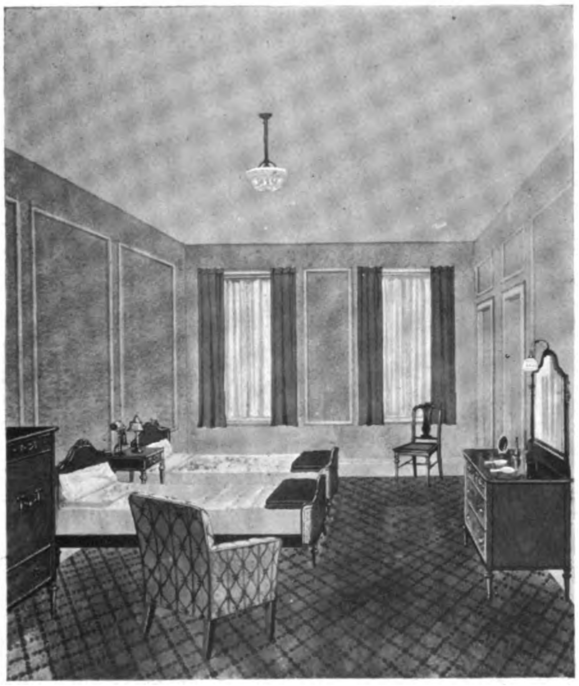


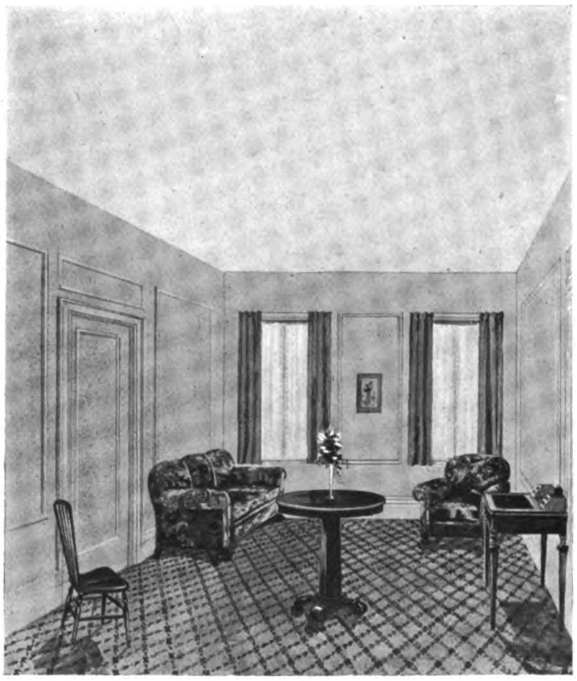
HALLWAY, PICTORIAL REVIEW BUILDING, 39TH STREET AND 7TH AVENUE NEW YORK.

Renwick, Aspinwall & Tucker, Architects.



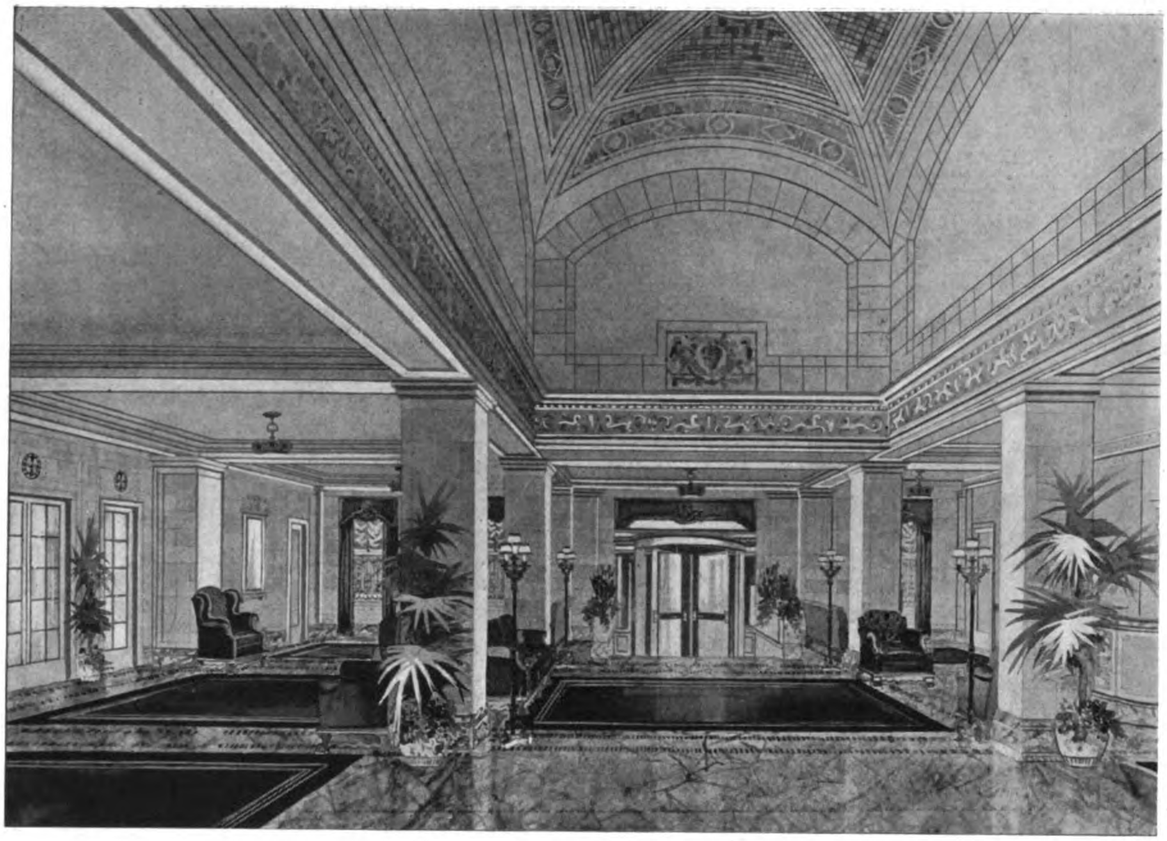
PRESS ROOM, PICTORIAL REVIEW BUILDING.

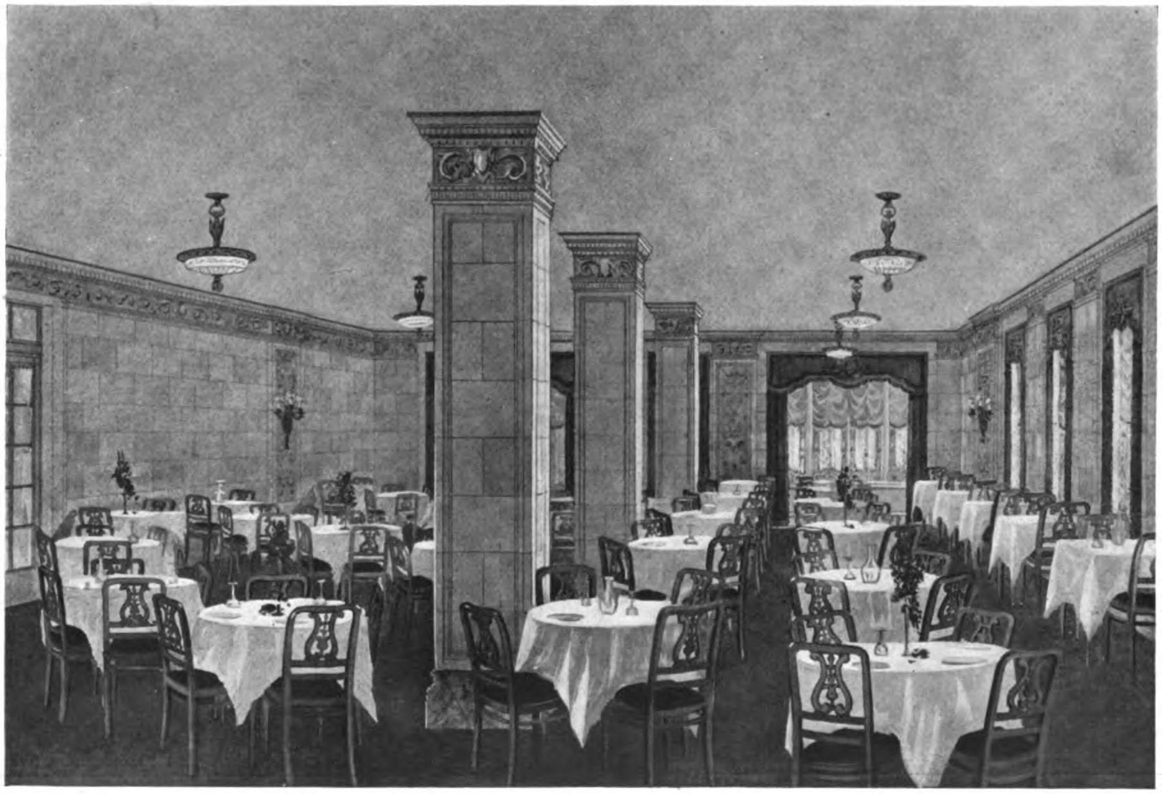




HOTEL EMBASSY, 70TH STREET AND BROADWAY, NEW YORK.
William H. Gompert, Architect.

ARCHITECTURE AND BUILDING. Plate 74.
Interior equipment—L. Barth & Son; mason contractors—Fullam Construction Co.

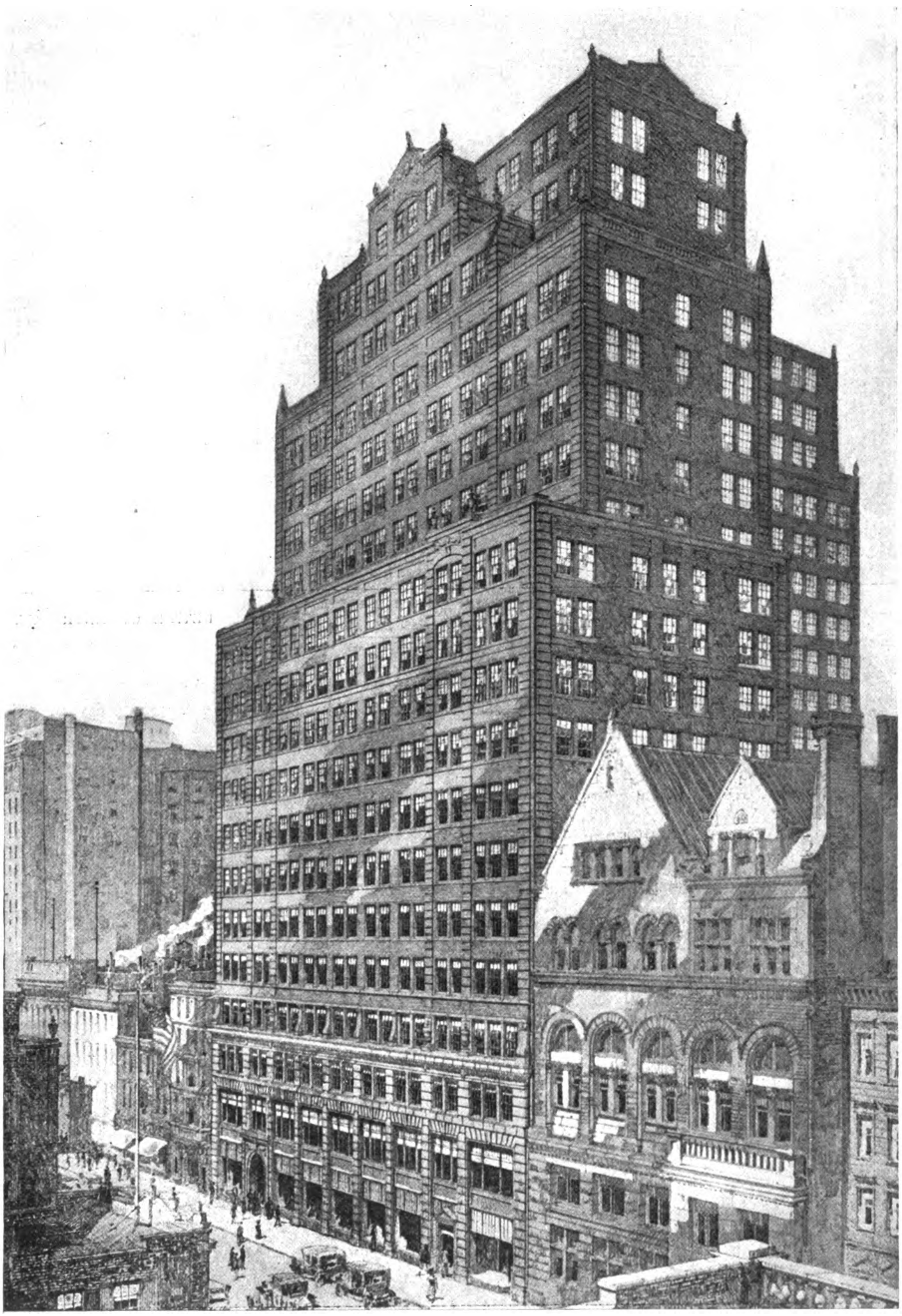




LOBBY AND DINING ROOM, HOTEL EMBASSY, 70TH STREET AND BROADWAY, NEW YORK.

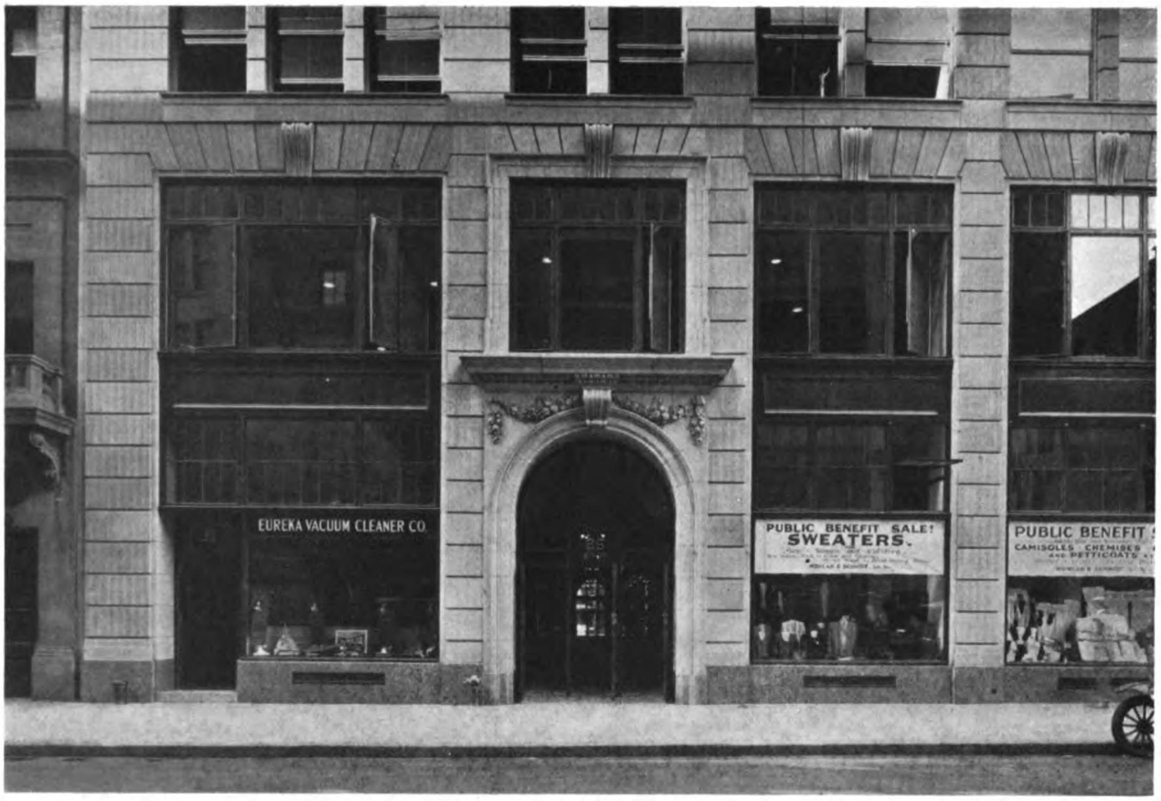
William H. Gompert, Architect.

ARCHITECTURE AND BUILDING. Plate 75.
Interior equipment—L. Barth & Son; mason contractors—Fullam Construction Co.

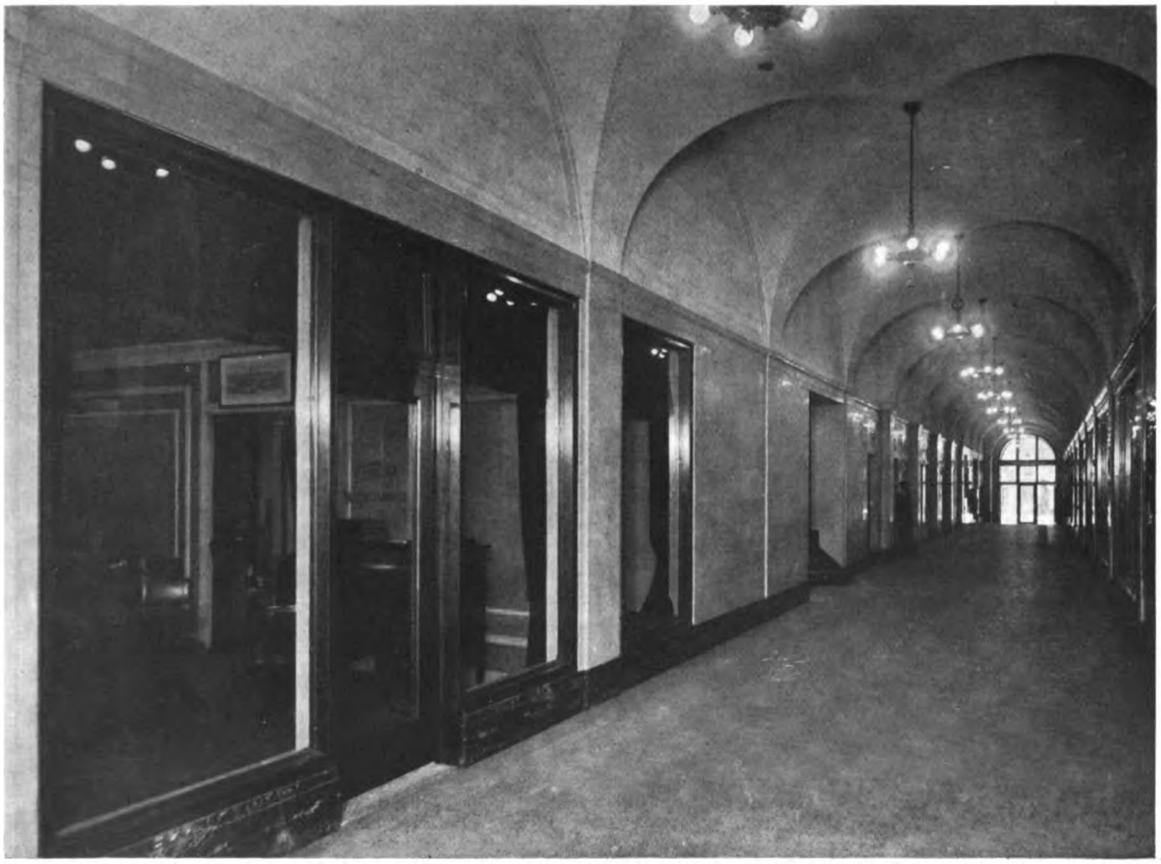


NATIONAL ASSOCIATION BUILDING, 25 W. 43RD STREET, NEW YORK.
Starrett & Van Vleck, Architects.

Architecture and Building. Plate 76.
Built by Fred T. Ley & Co.; ornamental iron—Sexauer & Lemke, Inc.



DETAIL OF ENTRANCE.

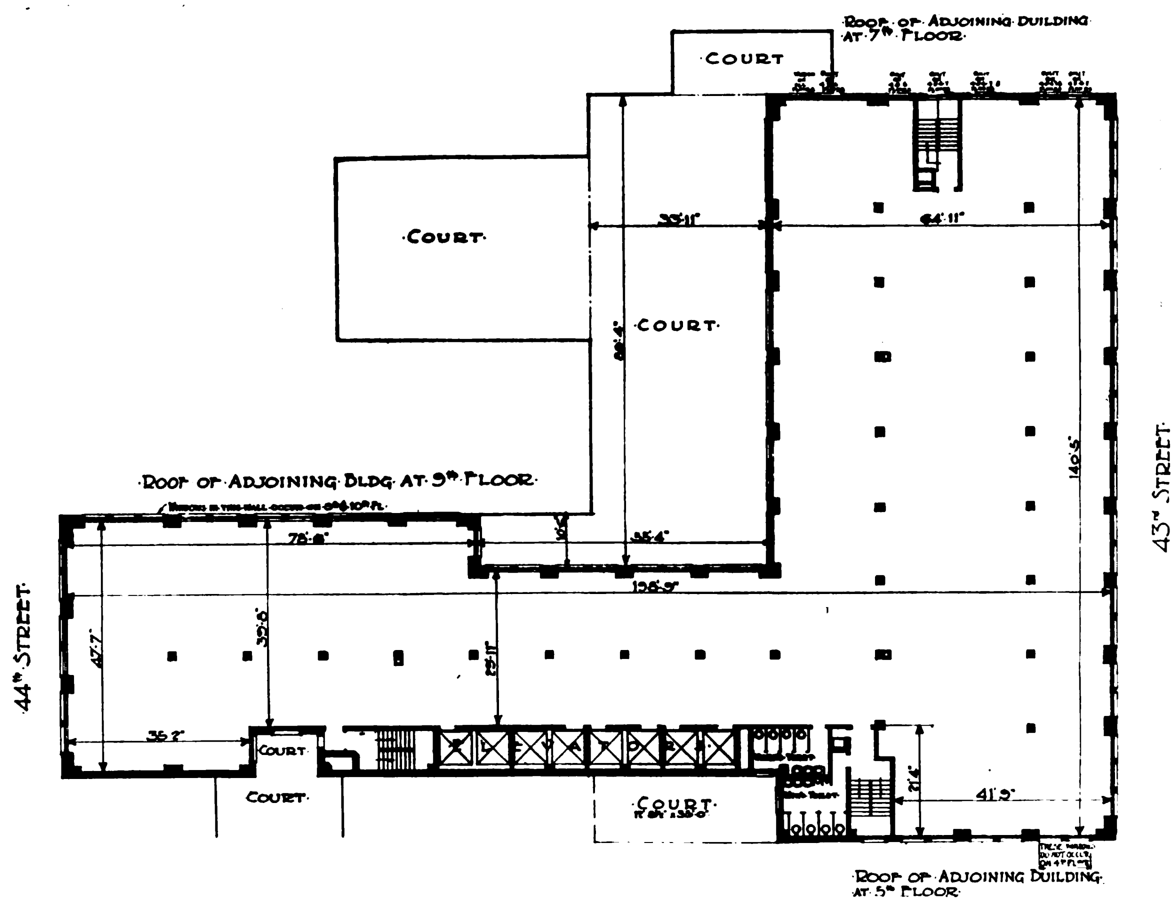


CORRIDOR, NATIONAL ASSOCIATION BUILDING, 25 WEST 43RD STREET, NEW YORK.

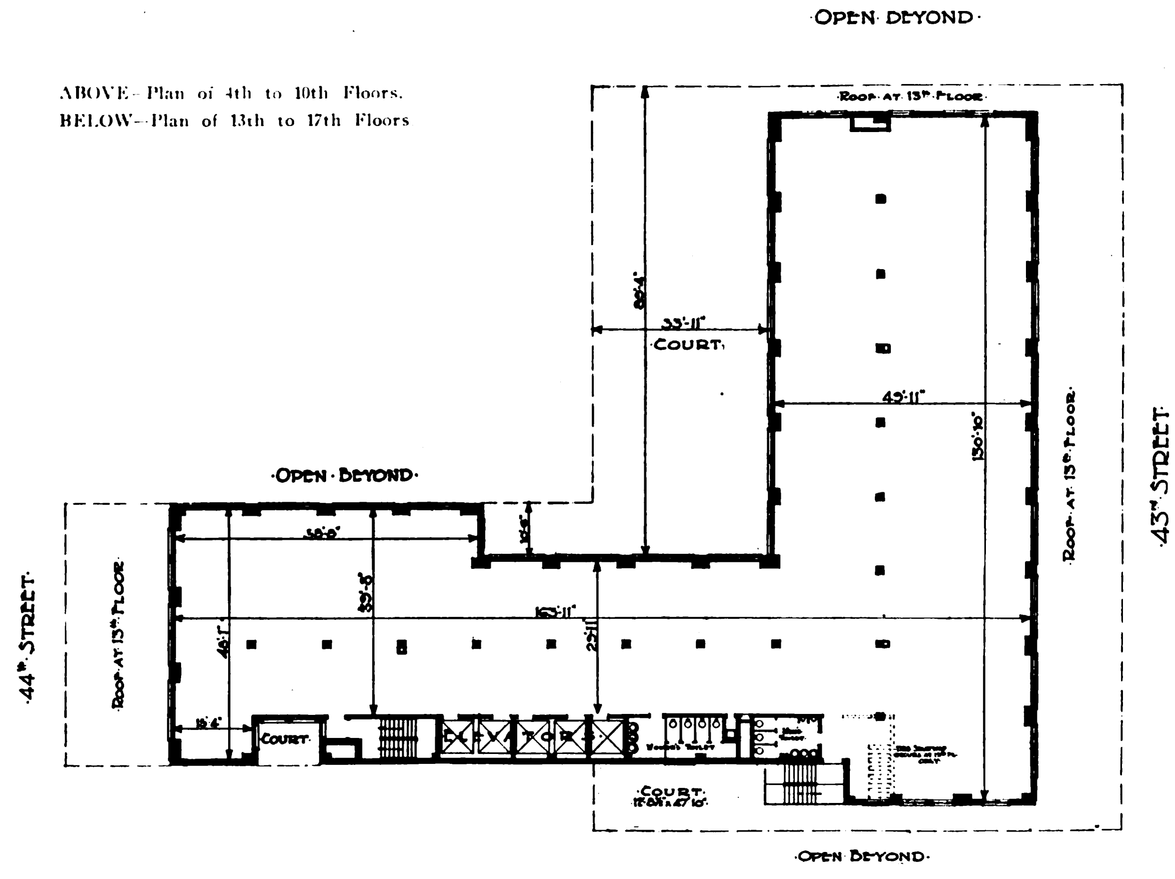
Starrett & Van Vleck, Architects.

ARCHITECTURE AND BUILDING. Plate 77.

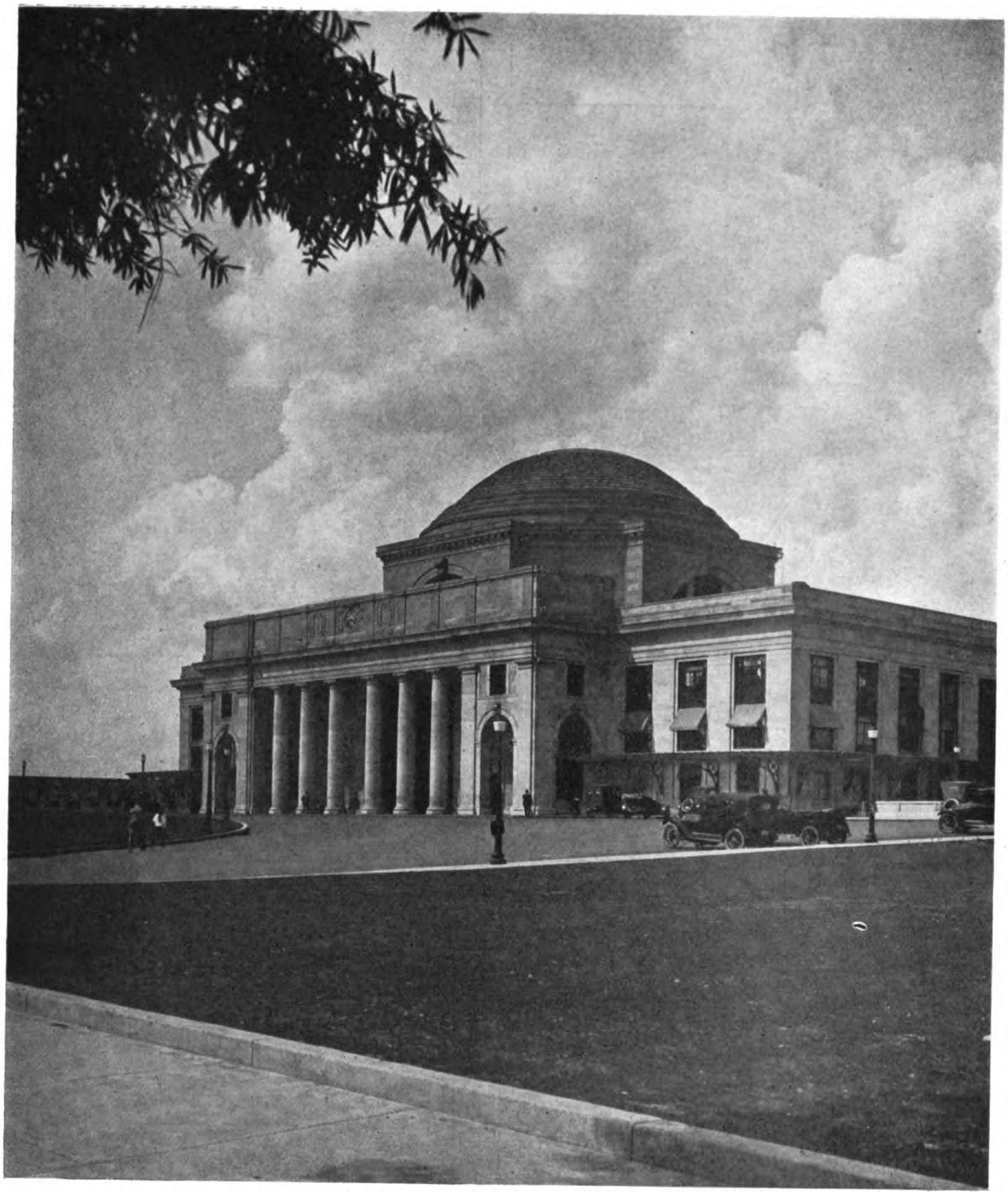
Built by Fred T. Ley & Co.; interior marble—Friedman Marble & Slate Works, Inc.; plastering contractors Conroy Bros.; painting and decorating—L. S. Fischl's Sons, Inc.



ABOVE—Plan of 4th to 10th Floors.
BELOW—Plan of 13th to 17th Floors

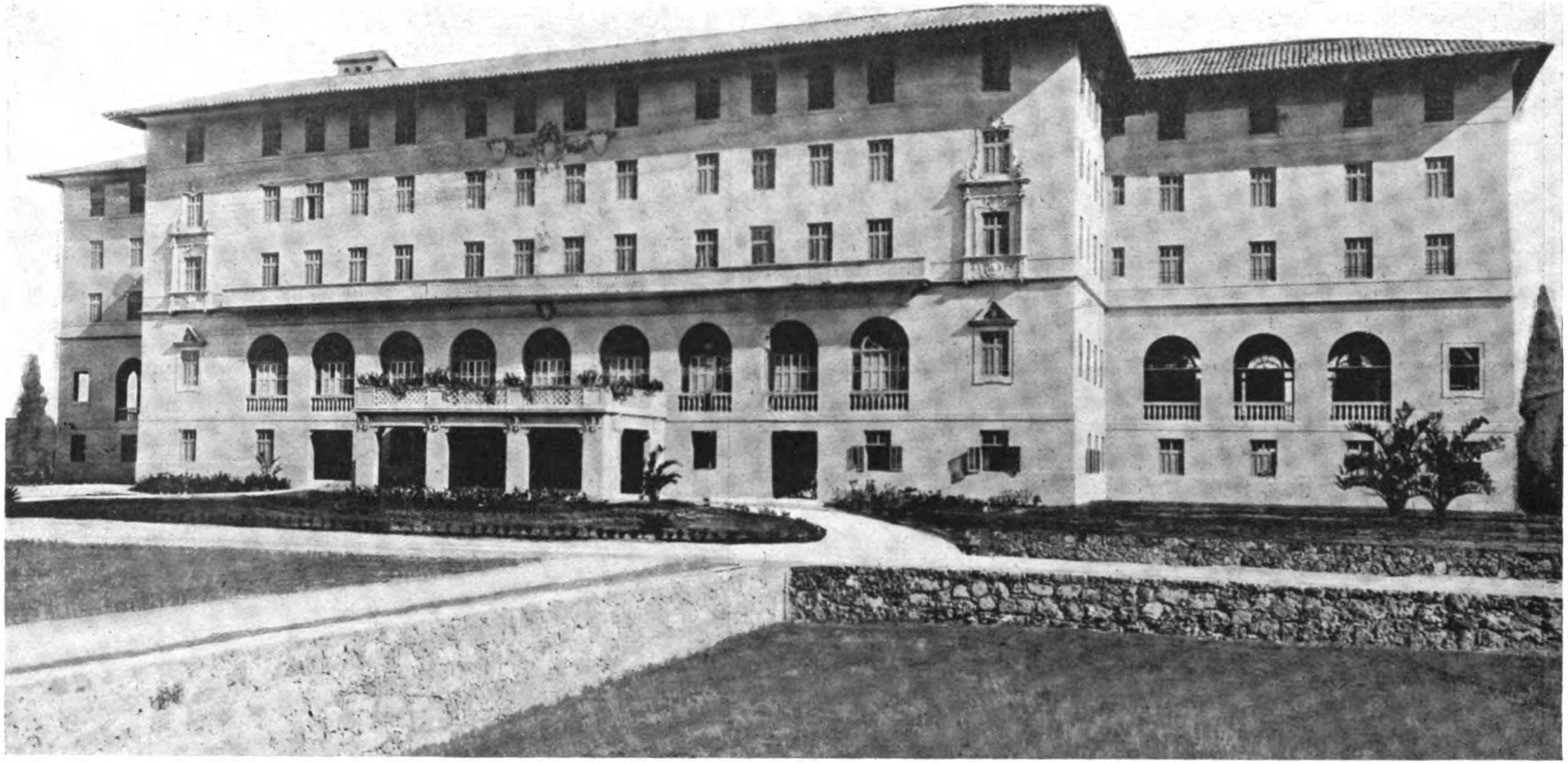


NATIONAL ASSOCIATION BUILDING, 25 W. 43RD STREET, NEW YORK.



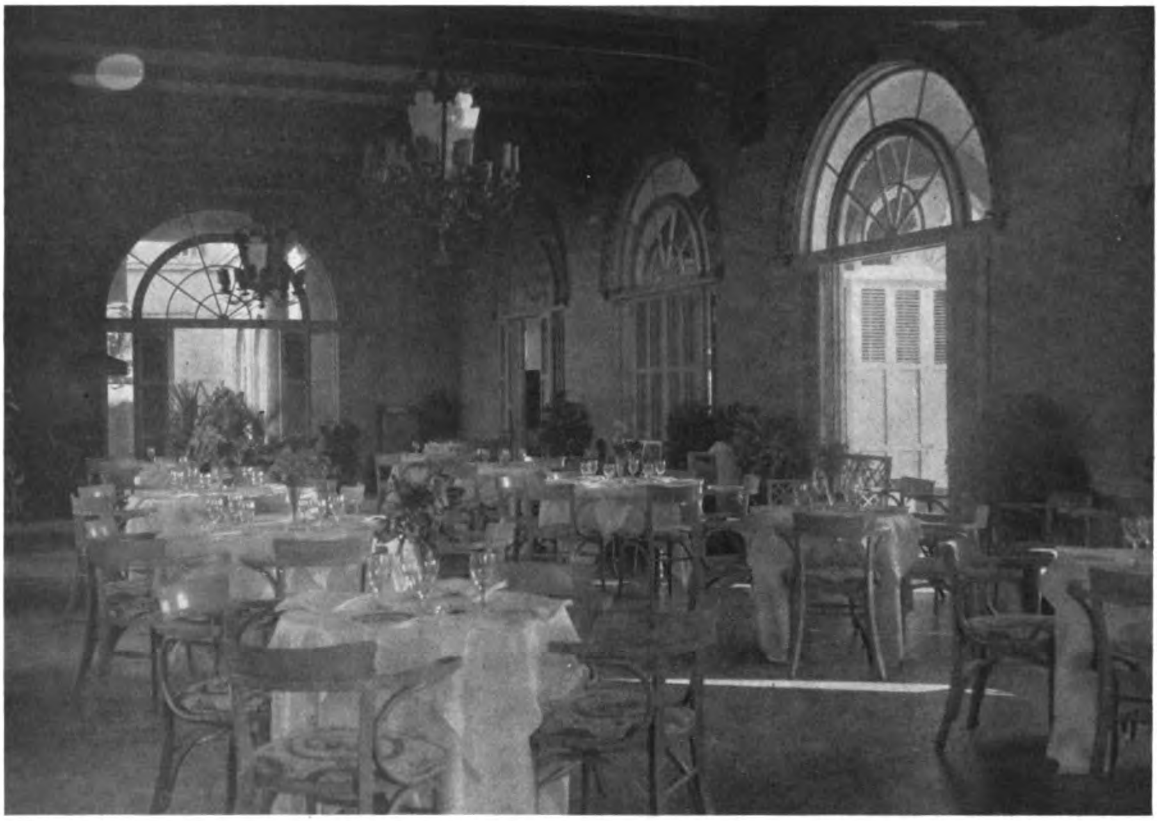
UNION STATION, RICHMOND, VA.
John Russell Pope, Architect.

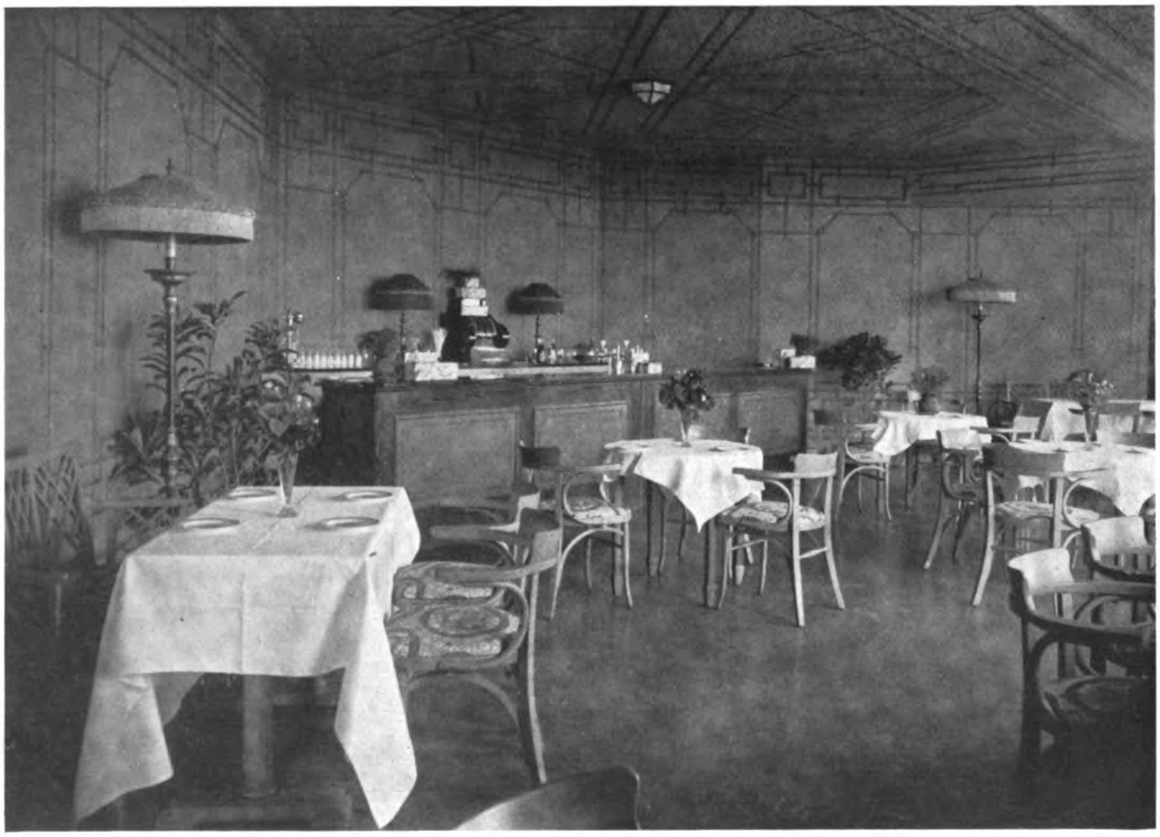
Built by John H. Parker Co.; glass—Binswanger & Co.



CONDADO VANDERBILT HOTEL, SAN JUAN, P. R.
Warren & Wetmore, Architects.

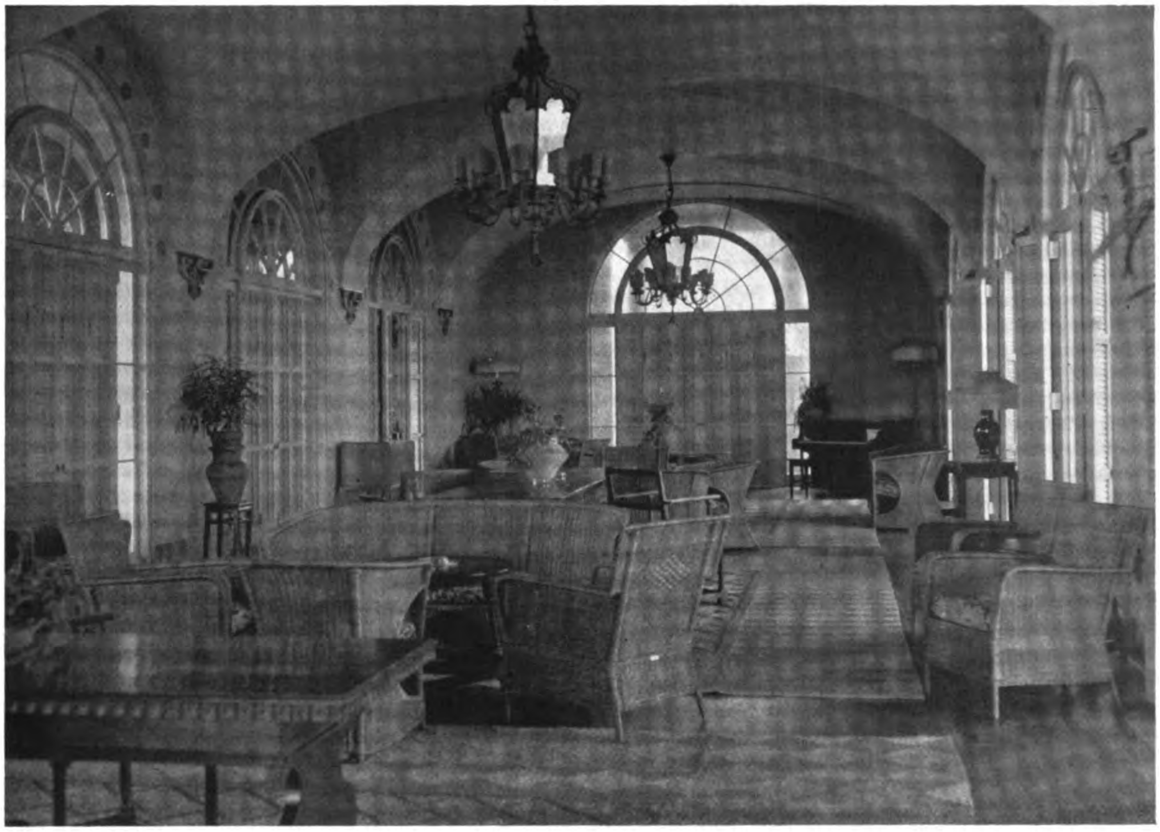
ARCHITECTURE AND BUILDING. Plate 80.
Built by F. B. Hatch; kalamein doors—Reliance Fireproof Door Company.

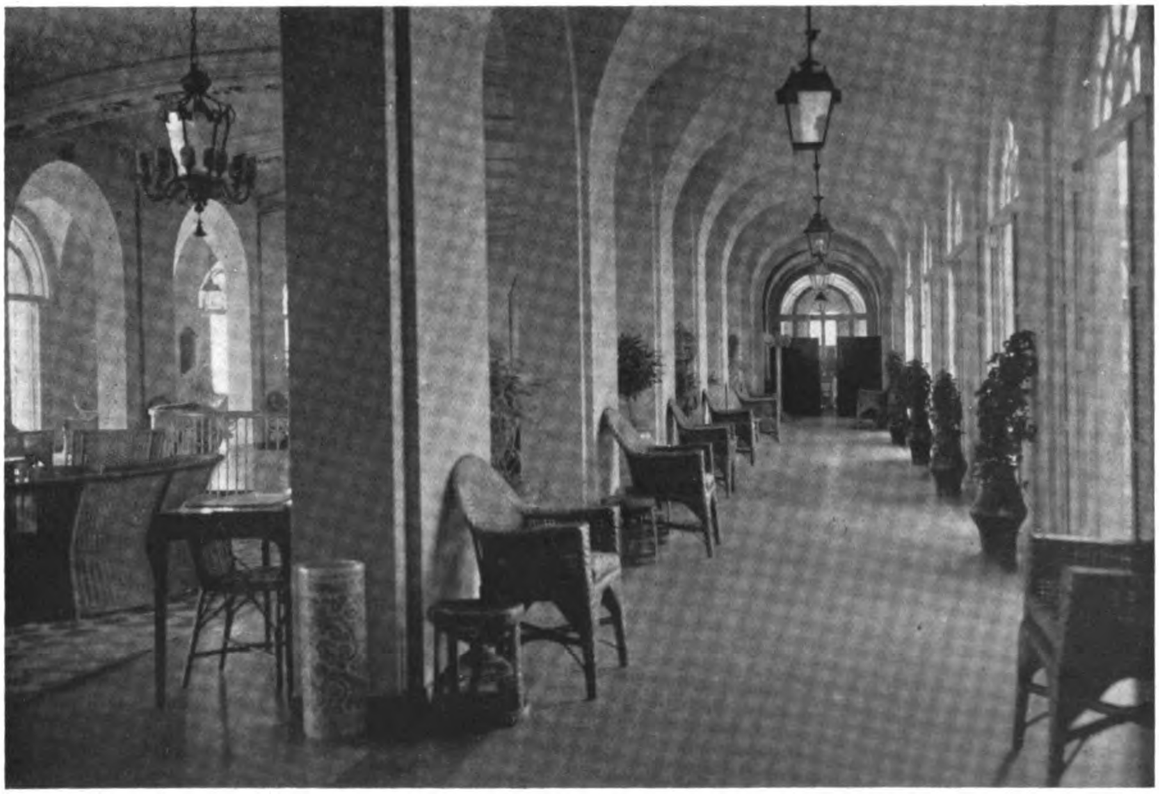




DINING ROOM AND CAFE, CONDADO VANDERBILT HOTEL, SAN JUAN, P. R.
Warren & Wetmore, Architects.

ARCHITECTURE AND BUILDING. Plate 81.
Built by F. B. Hatch.

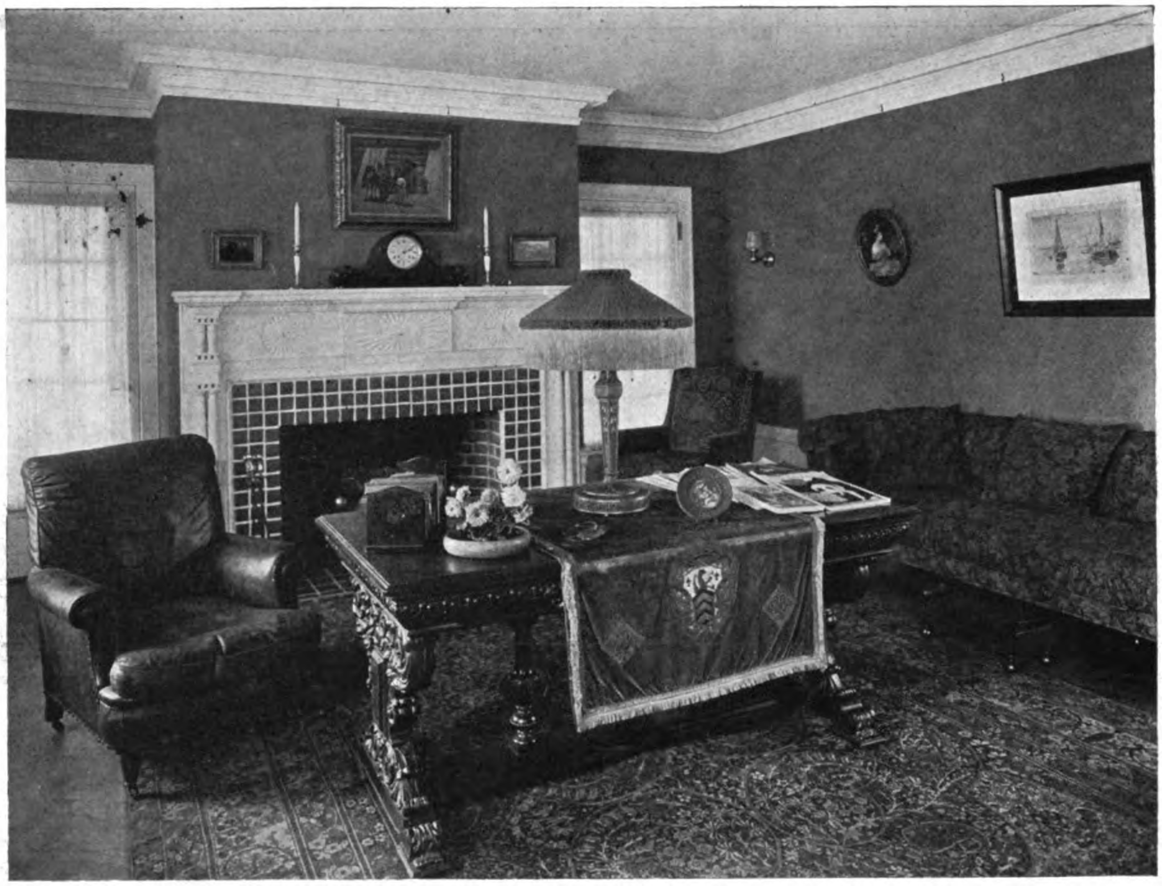


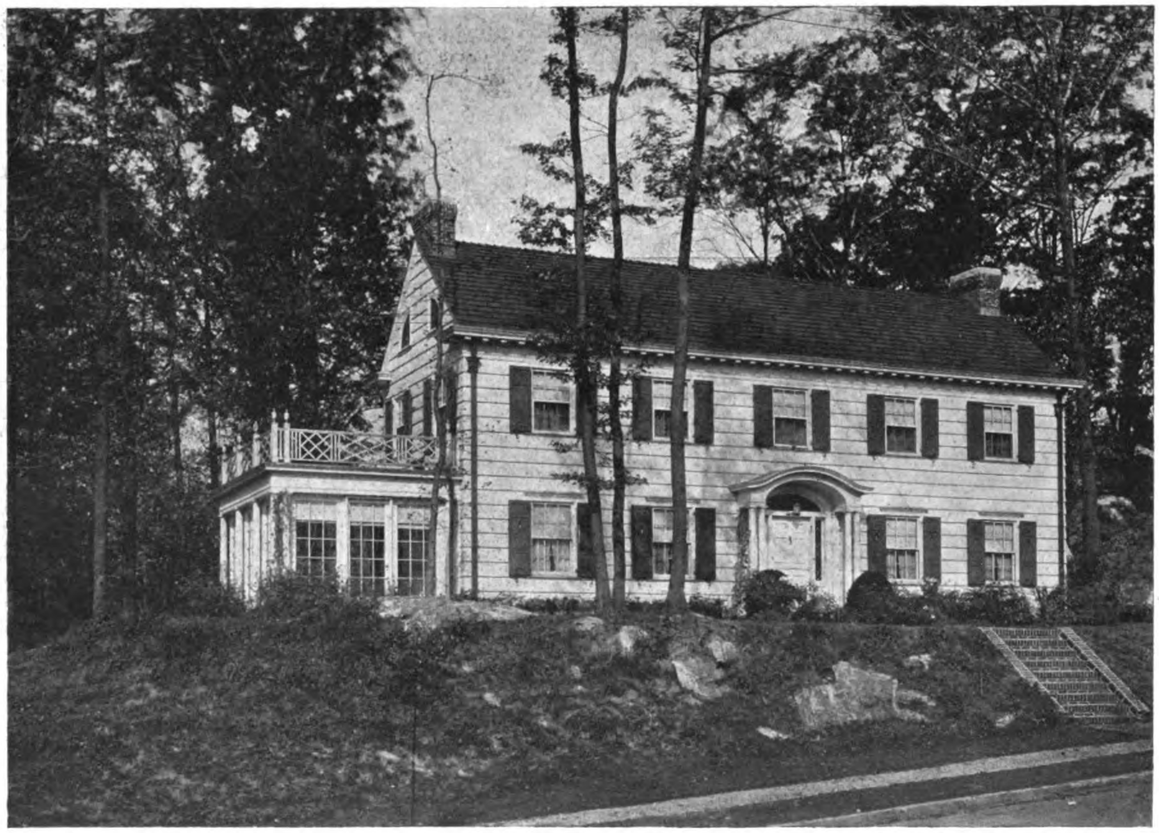


LOBBY AND LOGGIA ADJOINING LOBBY, CONDADO VANDERBILT HOTEL, SAN JUAN, P. R.

Warren & Wetmore, Architects.

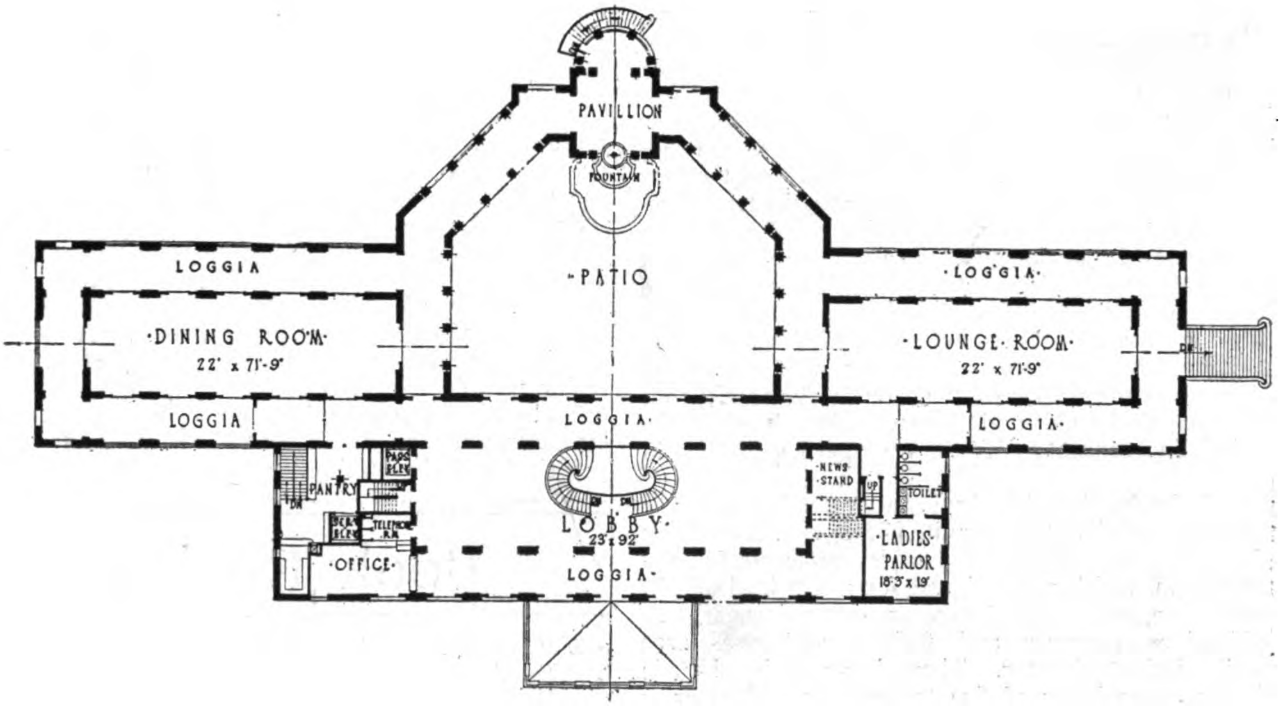
ARCHITECTURE AND BUILDING. Plate 82.
Built by F. B. Hatch.





RESIDENCE OF MR. DWIGHT JAMES BAUM, ARCHITECT, RIVERDALE-ON-HUDSON, NEW YORK CITY.

Built by Ahneman & Younkheere.



PLAN OF MAIN FLOOR.

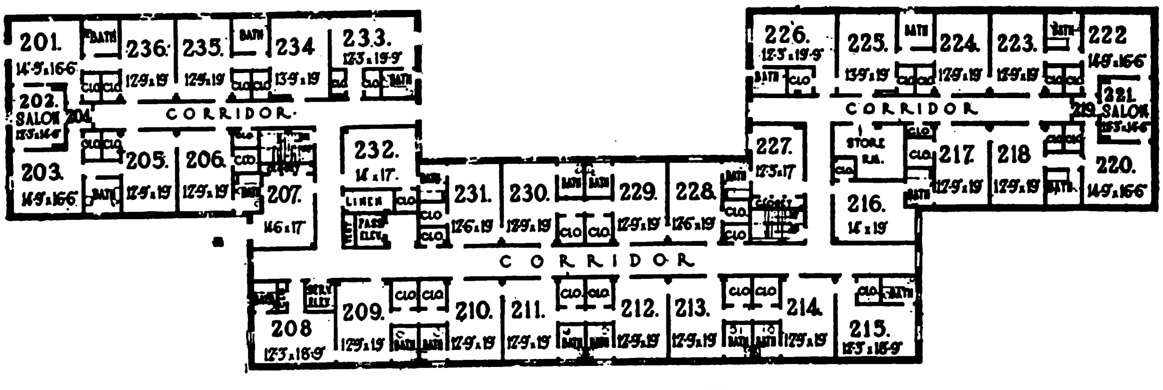
CONDADO-VANDERBILT HOTEL.

Porto Rico.

The recently completed hotel in the residential district, or the so named "Condado" of San Juan, Porto Rico, is said to be the first modern American built hotel in the West Indies. It is known as the Condado-Vanderbilt and is owned and operated on the European plan under the management of the Vanderbilt Hotel, New York City. It is on a narrow neck of land separating Condado Bay from the Atlantic and overlooks both bodies of water. Its extensive grounds include tennis courts, a golf course, bathing beach and every facility for water sports and fishing. A forty-five acre farm provides fresh vegetables, fruits and dairy products. There is also a fully equipped garage for the use of guests.

The hotel is constructed of reinforced concrete and contains ninety-eight rooms. The stories are high and all bedrooms have large French windows to provide a free air circulation. The appointments and service of the hotel equal that of any modern building and the mechanical equipment includes an extensive refrigerating system and incinerating disposal plant.

The plans show extensive loggias in the first story with an enclosed patio. The typical story plan shows that all of the rooms give a view of either the bay or the ocean and that all of the bathrooms also have outside windows. Warren & Wetmore were the architects and F. B. Hatch, the builder. The kalamein doors were supplied by the Reliance Fireproof Door Co.



PLAN OF TYPICAL FLOOR.

THE NEW PICTORIAL REVIEW BUILDING.

The recently completed building designed to meet the needs of the growing business of the Pictorial Review was one of the first structures actually started in New York after the signing of the armistice in 1918. The site on the corner of 39th street and Seventh avenue, adjoins the previous home of the publication, and the new building is joined to it so as to co-ordinate the two structures. The lot area of the new building is 107 by 146 ft., and there are 12 stories in the structure, with the clock tower and lantern rising 80 feet higher, making the total height of the building about 300 feet. The story heights are exceptional, so that in spanning the court separating the new and old building with connecting bridges the eighth floor of the new is at the eleventh floor level of the old, and the tenth floor level of the new building connects with the roof garden of the old one.

The design by Renwick, Aspinwall & Tucker is Gothic in motif, carried out in granite, limestone, face brick and terra cotta. Rock concrete is employed for the floor system, which are designed for a live load of 350 pounds per square foot. There are two passenger, two combination passenger and freight, and one large capacity freight elevator. There is an enclosed main stairway, a smoke-proof fire tower stair and exterior fire escapes.

Mechanically the building is fully equipped to meet the needs of the printing and pattern business of the company and provide the best working conditions for its employees. G. B. Beaumont & Co. built the structure, the terra cotta work was executed by the Federal Terra Cotta Co., and the kalamein doors and the bronze covered entrance and vestibule doors were all manufactured by the Reliance Fireproof Door Co. The painting was done by the W. P. Nelson Company. W. G. Cornell Company installed the plumbing and heating systems, and the toilet partitions were supplied by Betz Bros. Friedman Marble & Slate Works, Inc., did the interior marble and tile work in this building, and the "Barreled Sunlight" paint was made by the U. S. Gutta Percha Paint Co. A. B. See electric elevators are installed.

THE NATIONAL ASSOCIATION BUILDING.

This new office building operated under the same management as the Berkeley Building ties in with that structure in that the arcades in the two buildings are in line and afford a covered passageway from 43rd street through the National Association Building to 44th street and thence through the Berkeley Building to 45th street.

This arcade gives access to the elevators and stairways which are in a line along the westerly wall of the building. There are eight elevators, four of which are used for express service. Three of the elevators stop at the 12th floor, leaving five cars for through service to the 13th to 17th stories.

The toilet rooms are on the same side of the building adjoining the elevators and there are separate toilets for both sexes in every story.

The arrangement of interior courts provides as good lighting for the inside offices as for those facing on the streets. The building is restricted to office purposes but provision is made for division of space to suit the needs of tenants. Several of the stories are entirely open for firms in need of large office space while others are divided for small offices in a typical arrangement with a central corridor through the front wing of the building.

In accordance with the New York zoning law the building has a setback at the 13th story. The net area of the lower stories is 15,500 square feet and of the upper stories where the area is reduced by the setbacks 7,350 square feet.

The exterior is finished in limestone and red brick and is designed without elaborate ornamentation. Starrett & Van Vleck are the architects and Fred. T. Ley & Company were the builders. Sexauer & Lemke, Inc., did the ornamental iron work. The interior marble work was done by Friedman Marble & Slate Works, Inc., and the plastering was executed by Conroy Bros. L. S. Fischl's Sons, Inc., did the painting and decorating.

Book Reviews

HOW TO MAKE AND USE GRAPHIC CHARTS; By Allan C. Haskell, B. S., New York, Codex Book Co., Inc., 6x9 inches, 540 pages, Cloth. Price, net, $6.00.

Mr. Richard T. Dana, who has written the introduction to this book, very well sets forth its purpose. Graphic methods are great time savers, the slide rule is a graphic calculator and the graphic chart goes the slide rule even one better in that its results are plotted and the steps leading to the cumulative total are all in evidence. Mr. Dana presents the following seven functions of charts which give an epitome of the book.

1. Computation (Mechanical).
    - Arithmetical and Geometrical Calculations.
    - Interpolation.
    - Calibration.
    - Intergration.
2. Tabulation.
    - Statistical Comparisons.
3. Plotting.
    - Sketches.
    - Maps.
    - Stadia survey.
    - Organization plans, location of buildings and machinery.
4. Recording.
    - Filing.
    - Blue printing.
    - Photographic Reproduction.
    - Statistical Comparison.
5. Demonstration.
    - For Instruction.
    - For Advertising.
6. Statistical Prediction.
    - Weather.
    - Population.
    - Vital Statistics, etc.
7. Notations.
    - Field Notes.

Practically any mathematical equation and almost any number of variables can be expressed by the graphic method with charts and interpolated mathematically without any computation at all. The obvious advantages of this fact hardly need be pointed out. With a proper chart such computations can be made not only more rapidly than by the older methods, but they can be entrusted to persons who are unfamiliar with the arithmetical or algebraical methods of computation, and they can be checked directly from the charts in the same manner.

There are ten principal kinds of charts: Rectilinear co-ordinates, equally spaced, decimal divisions; rectilinear co-ordinates, equally spaced, other than decinal divisions; rectilinear co-ordinates, unequally spaced, various divisions; logarithmic; semi-logthmic; polar; isometric; trilinear; monographic or arithmic; polar; isometric; trilinear; monographic or printed.

The value of charts for the presentation of facts in cumulative or comparative manner is becoming recognized more and more constantly. The mathematician and engineer were the pioneers but today it is not unusual to find charts used as a means of expression in most any field of endeavor. Trade journals of all classes frequently contain them in their pages. They are commonly used in reports on a great variety of subjects. The doctor, the merchant, the manufacturer, all find a use for them. Even in the hotel business they are extensively employed to give comparisons of costs and distribution of expenses.

One great advantage charts possess, as said before, is that they can be used accurately without a knowledge of mathematics. Any clerk when once given an example of their use can carry on the work and there is a fascination in developing them which leads the user on. The great value of this book lies in its great number of examples showing a variety of application suited to any purpose from the most simple plotting to the most exact calculation of formulae for engineering and mathematical uses.

From standpoint of technique in book making the scheme of numbering the figures of each chapter separately is not an advantage and text references to figures in other chapters are troublesome, particularly as the page heads do not give the chapter number.

MOTOR BOATS AND BOAT MOTORS. By Victor W. Page. New York, The Norman W. Henley Publishing Co. 6 x 8½ inches, 524 pages, 372 illustrations, cloth. Price $4.00.

The motor driven boat meaning by that a boat driven by some form of internal combustion engine may be anything from a power propelled canoe to an ocean going craft of large size and extensive accommodation. In the work now before us the author has presented a wide range of boat designs and considered the power plants suited to each. It is a complete handbook for all interested in any phase of motor boating, as it considers all details of modern hulls and marine motors, deals exhaustively with boat design and construction, design and installation of all types of marine engines and gives expert advice on boat and engine maintenance and repair. Not only is boat construction fully treated but every needed dimension is given for building. Everything from the selection of the lumber and laying out the boat molds to the finish of the completed craft is outlined in detail. The boats described have been built by the author and the plans are right.

In addition to the text by Mr. Page, there is a chapter by Mr. A. Clark Leitch on five small boat designs which will be greatly appreciated by those who wish to build or now own small boats. This chapter contains 25 fine plates giving plans, sections and details of construction.

There are chapters on motor boat classification and operation, giving pilot laws and much general information for navigation and operation.

In general the book is divided into two parts, one on "The Hull and Fittings," the other on "The Power Plant and Its Auxiliaries."

For those interested in aeronautics, there are some fifty pages in a final chapter on seaplanes and flying boats.

BUILDING CONSTRUCTION AND DRAWING. By Charles F. Mitchell, assisted by George A. Mitchell, A.R.I.B.A. Ninth edition with revised appendix. 1,100 illustrations. 5 x 7 inches. 480 pages. London: B. T. Batsford, Ltd. New York: D. Van Nostrand Company. Price $2.50 net.

The revision made in the year 1917 to the ninth edition of this familiar book enabled the author to add the latest syllabus of the Lancashire and Cheshire Union of Institutes together with the latest examination questions. To those unfamiliar with this standard book of English practice in the principles and details of construction, it may be said that the book known as Part I covers an elementary course in building construction and drawing, and gives the preparatory information necessary for the student to take technical examinations required in England. As English and American practice is similar in most respects, this book has been extensively used in this country. Being systematic in its preparation, it covers all the elements of construction and much relative to design without going into higher mathematics which makes the book a valuable one for reference for carpenters and builders on small construction work.

BUILDING CONSTRUCTION. By Charles F. Mitchell, assisted by George A. Mitchell, A.R.I.B.A. Part II. Advanced course. Ninth edition, revised and enlarged. 800 illustrations. 975 pages. 5 x 7 inches. London: B. T. Batsford, Ltd. New York: D. Van Nostrand Company. Price $4.50 net.

The advanced course known as Part II by the same authors now appears in a ninth edition, being extensively revised and brought up to date. The chapters dealing with graphic statics, riveting, pillars and girders have been rewritten to bring them up to meet modern conditions of the use of steel in construction. Much additional information with numerous worked examples of typical construction problems is to be found in the chapters on foundations and brick work. As in previous editions, the book is filled with valuable examples showing conditions of actual construction and many new examples and illustrations have been added throughout the text. This volume, being the advanced course, goes into design and theory of construction and has data of great value to the engineer in designing and figuring work. This book supplements much of the data given in the first volume and is one that should be secured by every student who has used the first volume and desires to advance his knowledge. Besides the various chapters on the materials of construction and the elements of their use, there are good chapters on roofs and roof coverings, joinery, stairs, stanitation, plumbing and heating apparatus, electric wiring, etc.

Current Notes

TESTS AND FACTS.

"Where ignorance is bliss it is folly to be wise" is certainly not a saying that was coined by an efficiency expert. Nevertheless, the saying is one that in principle has been has been the foundation of many city building codes. We will make no harsher remarks about building codes for we might be tempted to indiscretion. We will leave the subject to the thoughts of our readers. Recently, no doubt due to the pressure of circumstances and demand for increased building, a series of tests were conducted in Omaha, Nebraska, much to the enlightenment of the city authorities with results certainly not surprising to the building fraternity but none the less gratifying.

The comparison which attracted the most attention from the builders and architects present was that between the accepted "wood sheathing" plan now used in Omaha and "Bishopric" sheathing, which heretofore has not been permitted in Omaha because of its supposed lack of strength. Under a strain of 2,100 pounds the wood sheathing panel simply went to pieces as a complete wreck, the deflection being 5⅝ inches, while "Bishopric" sheathing showed a deflection of 1-9/16 inches under the same strain. Panels used were 4 x 8 feet, frames were nailed with 20-pennies, studs were 16 inches O. C. with two 10-penny nails to each bearing. Where sheathing was used it was ⅞ inch shiplap stuff. Strain was applied by a 24-inch screw jack.

The first type of construction tested was that in ordinary use in Omaha under the building ordinances of this city, and known as "wood sheathing." The reverse side of the panel was wood-lathed. The strain was applied at a height of four feet from the bottom.

A pressure of 200 pounds showed a deflection of 5/32 inch; 400 pounds 5/16 inch; 600 pounds 19/32 inch; 1,200 pounds 1⅞ inches; 1,600 pounds 3¼ inches; 2,100 pounds complete failure.

The second test was of a panel with Bishopric sheathing instead of the ⅞-inch wood sheathing as in the former panel. In all respects save the matter of sheathing the two panels were the same. The strain was applied in the same manner.

A pressure of 200 pounds showed a deflection of ⅛ inch; 400 pounds 3/16 inch; 600 pounds 11/32 inch; 1,200 pounds 21/32 inch; 1,600 pounds 1 1/16 inches; 2,100 pounds 1-9/16 inches; 2,200 pounds the nails pulled from the sill and the panel separated, but there was no break in the board.

The building ordinances of Omaha are soon to be revised and the use of Bishopric sheathing will certainly be permitted. Other cities might well investigate these tests to their great advantages, for in these days of high costs and difficult building conditions any material, the quality of which is unquestioned, should be taken advantage of to the utmost.

The Bishopric products are standard in quality and economical in use. Their sheathing strengthens and braces the frame, it is insulating sound-deadening and weather proofing combined for use on exterior walls, sub-flooring and sub-roofing. The Bishopric stucco base and plaster base are made with interlocking dovetailed keys, making a solid bond for stucco or plaster and possessing all of the valuable qualities of the sheathing.

ROBERT MILLS.

"I trust a good deal to common fame, as we all must," said Emerson, and this sentence from the Journals of the Concord Sage has become the text of many a homily. But can we really trust to common fame, or must we see to it that her trumpeters are kept from falling asleep at their post?

Take the case of America's first architect, a man who in his apprenticeship days drafted the plans of the Capitol at Washington, who designed three of the greatest one-man monuments in the country, who sowed broadcast over the nation plans for buildings, exerting a powerful influence on American architecture. What has common fame done for him?

He was named as a candidate for the Hall of Fame this year, and most people who read about him wondered who he was. America's first architect was Robert Mills. From his great-grandson and nominator, Major Mills Miller, of the Ninth Coast Defense Command, C. A. C., stationed in New York, the present writer learns that Robert Mills was born in Charleston, S. C., in 1781, of distinguished lineage—the great-great-grandson of Landgrave Thomas Smith, Governor of Carolina in 1690-94.

President Jackson called him to Washington and made him Government architect in 1830. While holding this office, Mills built the United States Postoffice, Treasury Building and Land and Patent Offices, besides innumerable custom-houses and state and federal buildings from New York to New Orleans.

But the most important work of Robert Mills was the designing of the Washington Monument in Washington, D. C., the Washington Monument at Baltimore and the Bunker Hill Monument in Boston.

These three great memorials alone should have entitled Mills to a liberal share of popular fame; but he was modest, forgetting often to sign his plans, and he was a Southerner who died on the eve of the greatest Civil War in history, and so national celebrity seems to have passed him by.—From the Kansas City "Star."

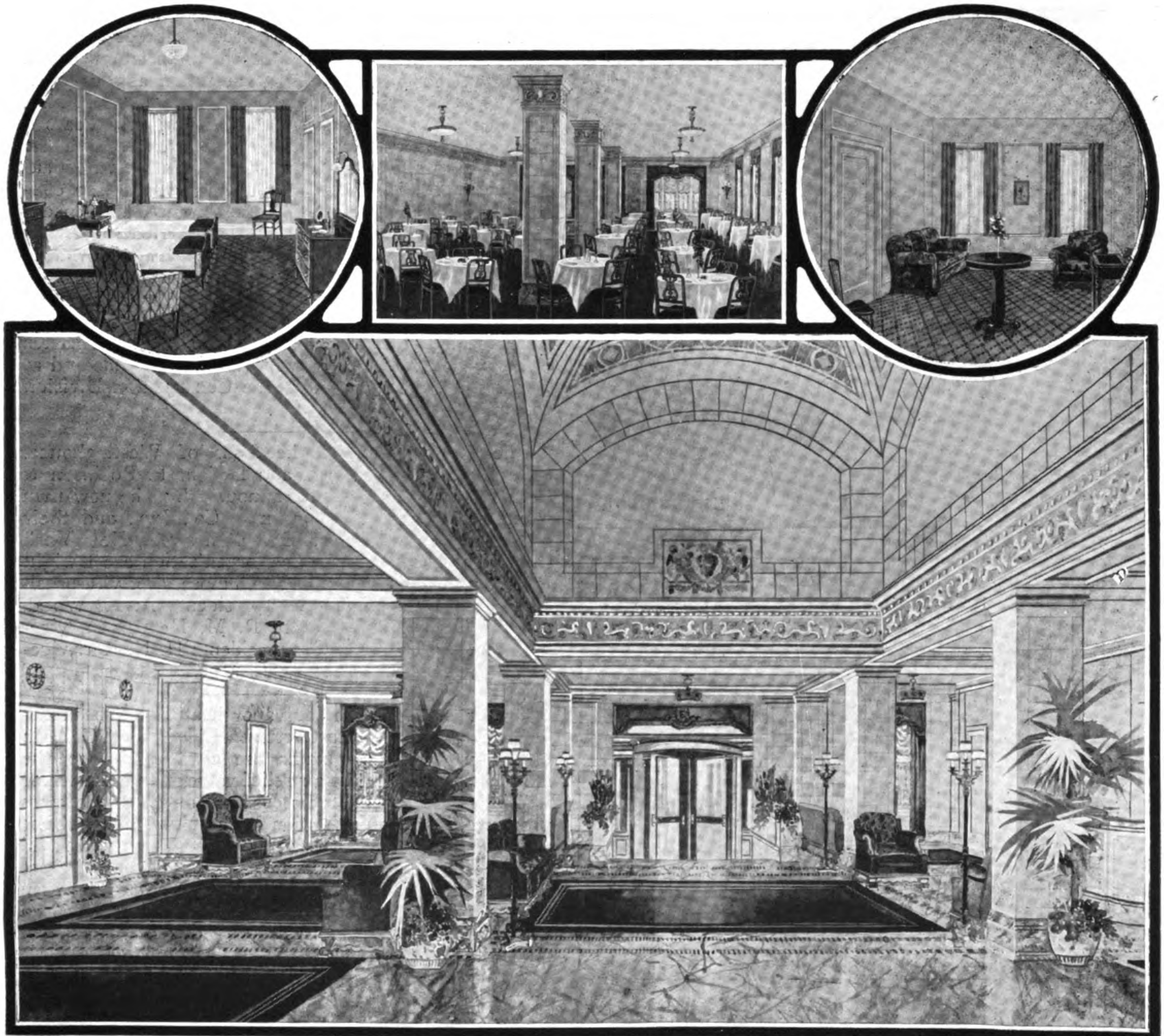
BELGIAN PLATE GLASS.

The production of glass has long been important in the maintenance of Belgian export trade; in 1913, the Belgian factories produced about 3,000,000 square yards of plate, and 48,000,000 square yards of window glass. About 90 per cent. of the Belgian product before the war was exported

One of the eight large plate glass factories was destroyed. The others are in operation. All of the window glass plants are in full or partial operation. Again owing to shortage of raw material, production is restricted to about 60 per cent. of normal.

Mills, Rhines, Bellman & Nordhoff announce that Mr. Chester B. Lee has been admitted to partnership in their firm July 1, 1920. Their architectural offices are at 1234 Ohio Building, Toledo, Ohio.

(Continued on page 20—Adv.)



The New Embassy Hotel ***will be completely furnished by*** **L. Barth & Son, Inc.**

In the New Embassy Hotel the guests will be able to dwell amid an atmosphere of art, homelike comfort, and the practical.

These illustrations of some of the Interiors of the New Embassy Hotel at 70th Street and Broadway, New York City, merely suggest the fascinating beauty that the furnishings of this exceptional hotel will have.

WILL BE PRACTICAL

In planning the New Embassy Hotel, the fundamental first thought was practicality. For the impractical is out of place in the Hotel enterprises of this wonderful twentieth century. Hence the furniture, china, glassware, silverware, carpets, rugs, hangings have been chosen first of all because of their practical features.

WILL HAVE HOMELIKE COMFORT

The practical usually implies that which promotes comfort, but not always. For an article may be practical and yet not have the features for promoting comfort that another similar practical article may have. In such cases, ability to judge in a discriminating manner the various features of similar articles comes to the front. An experience of more than 50 years qualifies the Barth Service to act efficiently in such a capacity.

WILL BE DISTINCTIVELY ARTISTIC

In furnishing the Lobby and the Dining Room, the fundamental essentials—the practical and the comfortable—will be combined with the charming Florentine art. The imposing columns and ceiling, specially-woven-to-order carpets, commodious and elegantly made chairs in the Lobby will be of commanding elegance.

Constantly giving service like the foregoing is why we say come to Barth's when you want a hotel furnished completely or in part. And—come to Barth's especially when you want complete hotel furnishings in which art, comfort, and the practical blend with appealing charm.

Complete Equipment,
Utensils and Furnishings
for the Hotel, Restaurant,
Cafeteria, Lunch Room,
Institution, Bakery, Soda
Fountain, etc.

"Everything at One Place"

Est. 1868

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(Continued from page 70—Text)

The engineering contracting firm, Holbrook, Cabot & Rollins Corporation announce the association of A. Pearson Hoover with their organization as vice-president. The members of the firm now are J. W. Rollins, president; T. B. Bryson, vice-president; A. Pearson Hoover, vice-president; W. S. Patten, treasurer. Their offices are 6 Beacon street, Boston, Mass., and 52 Vanderbilt avenue, New York City. Mr. Hoover is a construction engineer of extensive experience, both in designing and executing work and has carried some very large projects through to completion. During the war, in the Construction Division of the U. S. Army, he bore the commission of Lieutenant-Colonel and was engaged on two large projects, the Boston and the New Orleans Army Supply Bases. As Constructing Quartermaster he completed the latter in a short period of time and at a cost which set a record in the Construction Division for low unit prices.

The consolidation of the firms of Westinghouse, Church, Kerr & Co., Inc., and Dwight P. Robinson & Co., Inc., has been recently announced. The new firm name is Dwight P. Robinson & Co., Inc., and their general offices are at 125 East 46th street, New York City. The officers of the new organization are Dwight P. Robinson, president; T. N. Gilmore, first vice-president; I. W. McConnell, vice-president; A. K. Wood, vice-president and treasurer; R. M. Henderson, vice-president; L. H. Bean, vice-president; H. H. Kerr, vice-president, Chicago office; W. L. Murray, secretary.

An air relief system for vapor heating has been developed recently by the Gorton & Lidgerwood Co. In operation the return mains are always open to the atmosphere through the air relief valve so that the vapor will flow freely to the radiators with only a few ounces pressure to overcome friction in the pipes. Should the pressure go above eight ounces the equalizing valve will open, letting steam into the relief pipes, which will close the air relief valve and equalize the pressure between the steam and return mains, thus maintaining a normal water line. A data sheet with diagram of installation and full information is issued by the company.

CIVIL SERVICE EXAMINATIONS.

On September 9th, Civil Service Examinations will be held for Highway Engineer, vacancies in the Bureau of Public Roads, Department of Agriculture, at an entrance salary from $2,100 to $2,700 a year.

On September 14th, for draftsman, architectural and structural steel, to fill two vacancies in the Lighthouse Service, Milwaukee, Wis., at $1,500 to $1,800 a year.

On October 1st, for Engineer Examiner, Class A at a salary from $3,900 to $4,800 a year and Engineer Examiner, Class B at a salary from $2,220 to $3,600 a year to fill vacancies in the Interstate Commerce Commission, Bureau of Finance, under the Interstate Commerce Act.

For Electrical draftsman to fill vacancies in the Office of Chief of Engineers, War Department, Washington, D. C., at a salary from $1,200 to $2,400 a year.

On December 1st, for Engineer, Assistant Engineer and Junior Engineer to fill vacancies in the Water Resources Branch of the Geological Survey at salaries ranging from $1,440 to $2,400 a year.

Full particulars about these examinations may be obtained by writing to the Civil Service Commission, Washington, D. C.

August

ARCHITECTURE AND BUILDING

PUBLISHED BY THE WILLIAM T·COMSTOCK COMPANY NEW YORK

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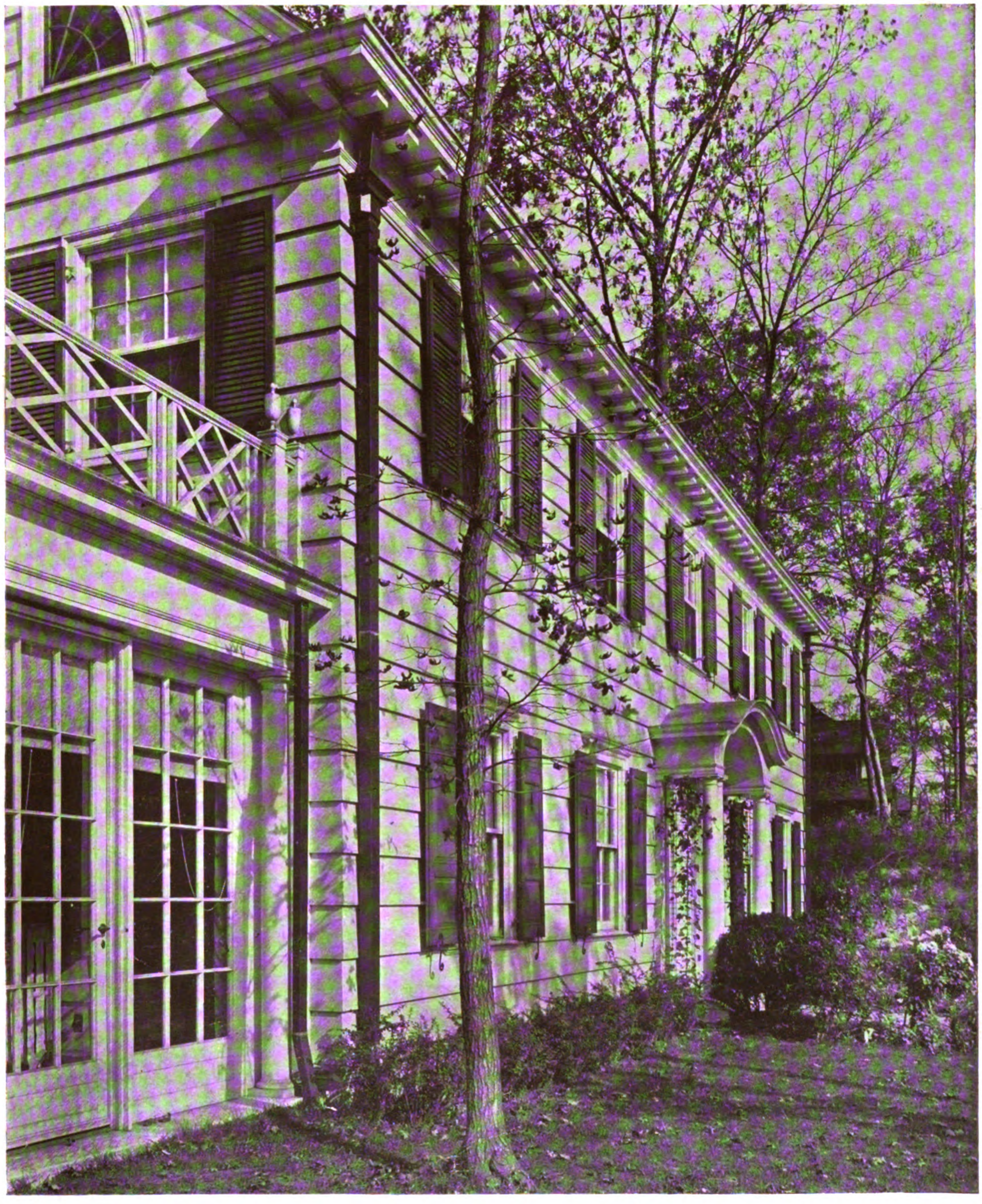

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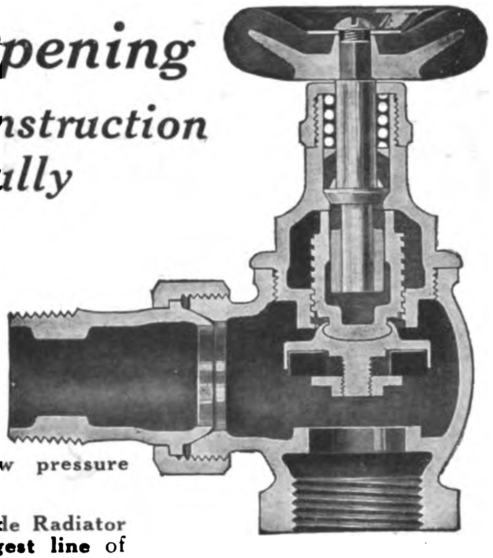

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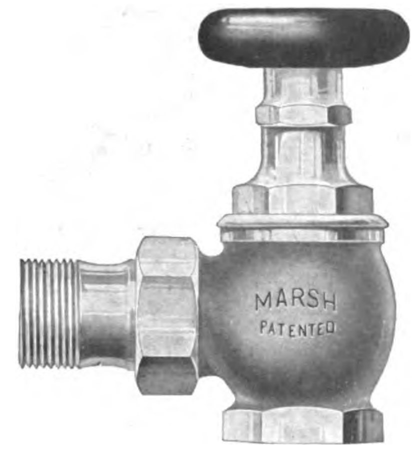

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See Ambassador Hotel, Plate 98.

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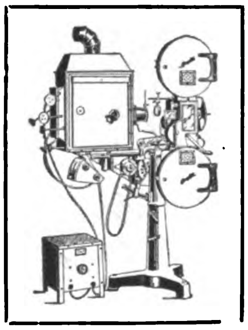

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Volume LII **Number 8**

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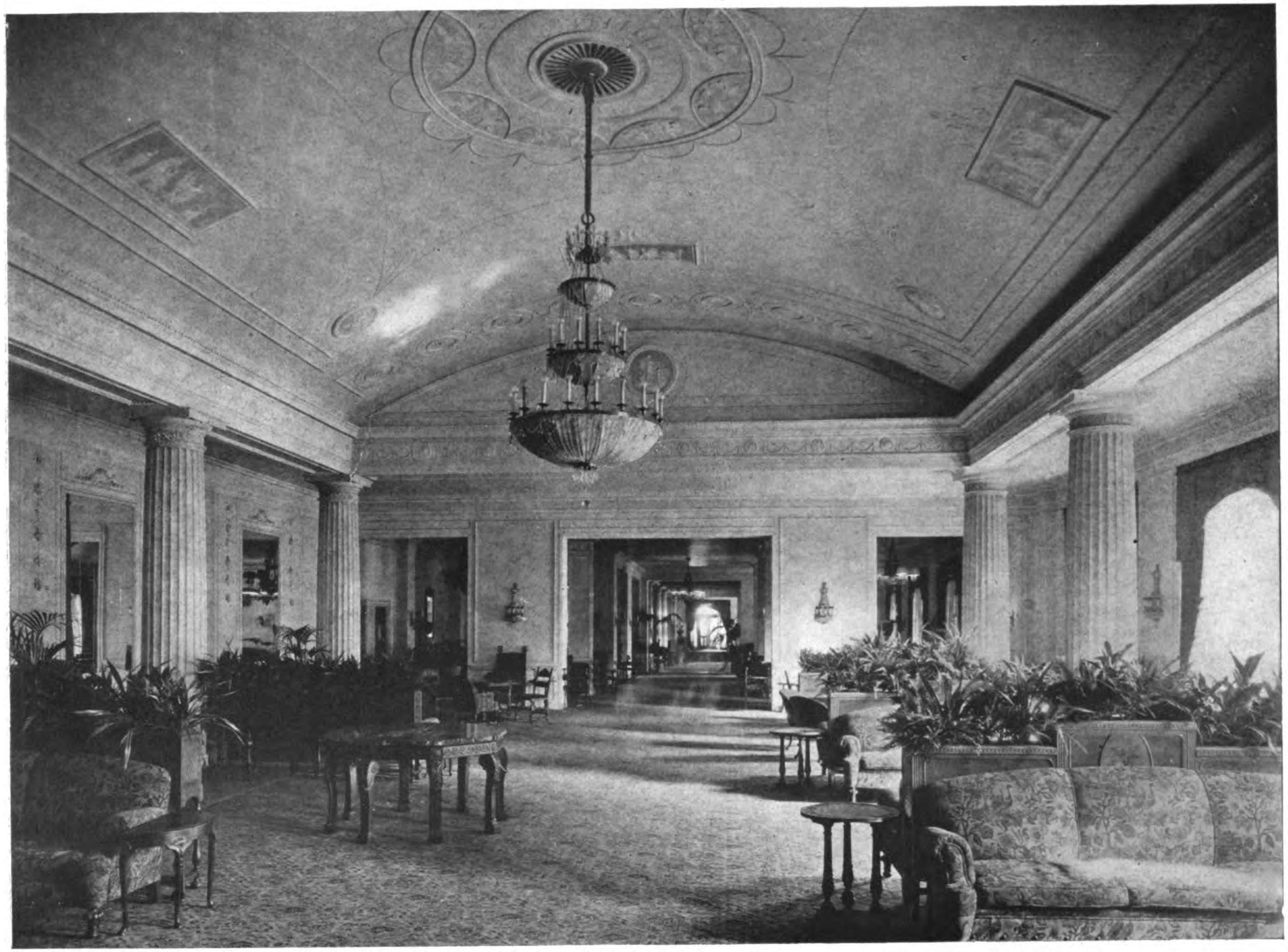


PORTION OF GRAND LOBBY, NEW ANNEX, HOTEL AMBASSADOR, ATLANTIC CITY, N. J.

Warren & Wetmore, Architects.

Lobby furniture made by Shaw Furniture Co.

ARCHITECTURE AND BUILDING

A Magazine Devoted to Contemporary Architectural Construction

WILLIAM P. COMSTOCK
Managing Editor

Volume LII AUGUST, 1920 **Number 8**

HOTEL AMBASSADOR, ATLANTIC CITY, N. J.

That section of Atlantic City known as the Chelsea district is in process of rapid development. At present the new Hotel Ambassador is its most prominent feature but further projected construction will extend the improvement in the section and make its hotel accommodation of very extended scope. The Ambassador when opened in the summer of 1919 was complete in equipment and contained 400 guest rooms. Since then its capacity has been doubled to 800 rooms and extensive entertainment facilities have been added. It stands as a forerunner, however, for work on the new Ritz Carlton Hotel is being rapidly pushed and many minor operations are also under way. Less than a year's time will see a great change in the Chelsea district with many new residences, shops and places of amusement. Not the least interesting part of this development is the construction of bungalow colonies in connection with both the Ambassador and the Ritz Carlton. The California type bungalows connected with the Ambassador are directly across the street from the hotel and add considerable room space as well as a picturesque feature to the surroundings of the main edifice. This group of bungalows is now completed. The similar group connected with the Ritz Carlton will be completed about the time that hotel will be ready to open. Atlantic City, always occupied to capacity, will have its facilities considerably extended by these improvements in the Chelsea district and will be in a position to more than ever attract and furnish accommodation for conventions and large gatherings of business and social character. Its present domination of the resort business of the country as an all-year pleasure resort need not be commented upon.

The Hotel Ambassador as completed represents the work of two architectural firms. Clinton & Russell designed the portion completed in 1919 and Warren & Wetmore the recently opened addition. Architecturally the exterior design of the new portion is well tied in with the first section built, but in general it follows simpler lines and is developed in plain wall surfaces and with less interruption at the roof line. The large pavilion extends the arcades along the front of the original portion and gives symmetry and uniformity of motive to the whole.

The portion originally built has a frontage upon the boardwalk and upon Brighton Avenue. The addition doubles the area covered by the building originally and extends it along Brighton Avenue to Pacific Avenue. In the original portion is the main lobby which occupies the entire front of the hotel facing upon the boardwalk. Balconies run around the entire lobby and there is a loggia raised above the boardwalk and facing the sea. This loggia or sun deck easily accommodates 500 persons. The Italian Garden also opens from the lobby and beyond is the main dining room. The Neptune Grill and the Japanese tea room were also features of the original portion of the structure. The rooms four hundred in number in the original portion are all exceptionally large and a bathroom is provided with each. Parlors are also provided so that they can be connected with one or several bedrooms, en suite.

With the opening of the new portion there are now eight hundred rooms in all, each with its bathroom. The additional rooms are as ample as any of those in the first portion built. The new features added to the public accommodations are a large salt water swimming pool, a sunken grill, convention hall and ballroom, the Renaissance room and promenade decks encircling the entire hotel. The new pool is large enough for water sports, such as polo and for swimming races. The water will be heated in winter so as to give a uniform temperature throughout the year. The sunken grill is planned in an interesting way and its decorations are striking. The dancing floor is five feet below the main floor level and surrounding it the chairs and tables rise in tiers lake an arena. The color scheme is orange and black. The walls and columns are beautifully decorated with oil paintings of winged sphinx, sea horses, cupids, gargoyles and shells, combining blues, greens and reds with harmonious effect. One face of each pillar represents a street lamp and the lighting is mainly from this source, although there are inverted globes in sufficient quantity to permit a soft glow to spread over the room. There are benches in the alcoves to match the chairs and tables, which are orange in color with a thin black stripe, the chairs having black leather seats. Stone gargoyles, facing each other, with a chain connection from mouth to mouth form a railing about the dancing floor. The sunken grill. can be converted into an ice skating rink during the winter months, so that guests will be afforded the unique opportunity of being able to swim in a gigantic tropical pool, after which they can bundle up in skating togs and have all the thrills of a northern ice carnical. A rearrangement of the dining rooms provides one for American and one for European plan.

The investment in the Ambassador is between nine and ten millions of dollars, a large portion of which is represented by its elaborate decorations and furnishings. These may best be judged by the accompanying plates.

Thompson-Starrett Company were the builders of the new addition, and the Shaw Furniture Company made all the lobby furniture. The common brick was all supplied by the Somers Brick Company. The Brooklyn Steam Marble Co., Inc., did the marble work and W. G. Cornell Company did the plumbing work. The wrought iron pipe used was made by Reading Iron Company.

The closet seats furnished by C. F. Church Mfg. Company, are covered with "Pyralin" of a snowy white appearance. This is applied by a patented process in sheet form and is impervious to moisture or temperature conditions so that it will not discolor, craze or peel. All the paints used were made by Detroit Graphite Co.; bulletin boards were manufactured by the U. S. Changeable Sign Co., and the watchman's clock system was installed by the Newman Clock Company. The fire boxes and gongs were installed by the Atlantic City Auxiliary Fire Alarm Co. The terra cotta partition blocks were supplied by Phillips-Harper Company; the plumbing fixtures by J. D. Johnson Company, Inc., and the hot water service heaters and swimming pool heaters were built by the Whitlook Coil Company; the waterproofing was done by the Storm Waterproofing Corporation. Keystona is used on all the walls, and the reflectors used are those manufactured by I. P. Frink. On the original part, Baird-Osterhout Company were the electrical contractors and Bourn Rubber Company supplied the insulated wire. "Impaco" flat wall paints were furnished by the Imperial Paint Company.

STUDIO AND LABORATORY OF THE FAMOUS PLAYERS-LASKY CORPORATION.

This plant, located in Long Island City, collects the various Eastern departments of this corporation in one location, and consists of a studio building and a separate laboratory building adjoining. The construction is of typical reinforced concrete factory type with steel sash, and is as fire resistant as possible. The specialized requirements of the moving picture production business are so fulfilled in the planning that the utmost economy is obtained.

One of the most important considerations is the layout of the studio so that the work will progress evenly, so that the departments will work together in harmony and that each department in itself is efficiently laid out.

The main studio in the third story, 120 by 228 feet, is covered by a domed roof carried by trusses, leaving a clear space uninterrupted by column supports for the construction of sets. Surrounding the studio proper are the departments necessary to the actual making of the pictures. The art and decoration department are located here. The carpenter shop and adjacent to it, the assembly room, are separated from the stage by huge sliding doors, of such size as to permit the moving in and out of completed sets. The purpose of the doors is to prevent the noise attendant to the construction of sets from reaching the stage and interrupting the work of the actors and directors.

Across from the carpenter shop is the scene dock for the painting of scenery and backgrounds. Here also are the cameramen's lockers. In each corner of the front entrance to the studio are the general manager's offices and the cashier and casting department. These offices are accessible from the street or studio.

At the rear of the building there are wagon ramps leading from each side street down to a loading and unloading platform which is accessible to either the upper or lower stages.

The lower stage below is the same size as the main stage. The supports for the main stage are placed at intervals of 40 feet, which allows for the construction of smaller sets. Surrounding the lower stage are the lighting, heating and ventilating plants. The restaurant is on this level, also the property and paint store rooms.

The offices, dressing rooms and departments surround the entire four sides of the main stage. On the mezzanine floor are the executive offices and a board room. The private offices for the directors' cutting, assembling and projection rooms are also on this floor. The still department, which is equipped with the most up-to-date apparatus for turning out 10,000 stills a day, occupies the entire rear of the floor. The scene dock and the carpenter shop continue through to this mezzanine floor.

In the second story is the scenario department and the library. Elaborate suites of reception room, secretary's room, dressing room, bath and several large closets, have been provided for each star. Those playing leading roles will also have separate rooms with bath. There are smaller dressing rooms and rooms for extras. The rear of the entire story is devoted to the wardrobe department, convenient to the dressing rooms. The purchasing department occupies the front of this story and there are a number of private offices in addition to additional cutting, assembling and projecting rooms.

On the main studio level is a projecting room designed for the use of the executives and for special showings of featured pictures. The seating capacity is about fifty on the orchestra floor with a balcony for extra seating. There is space for a small orchestra.

The rear of the studio opens upon a lot upon which exterior sets will be built. Two tanks in the main studio floor provide for water scenes.

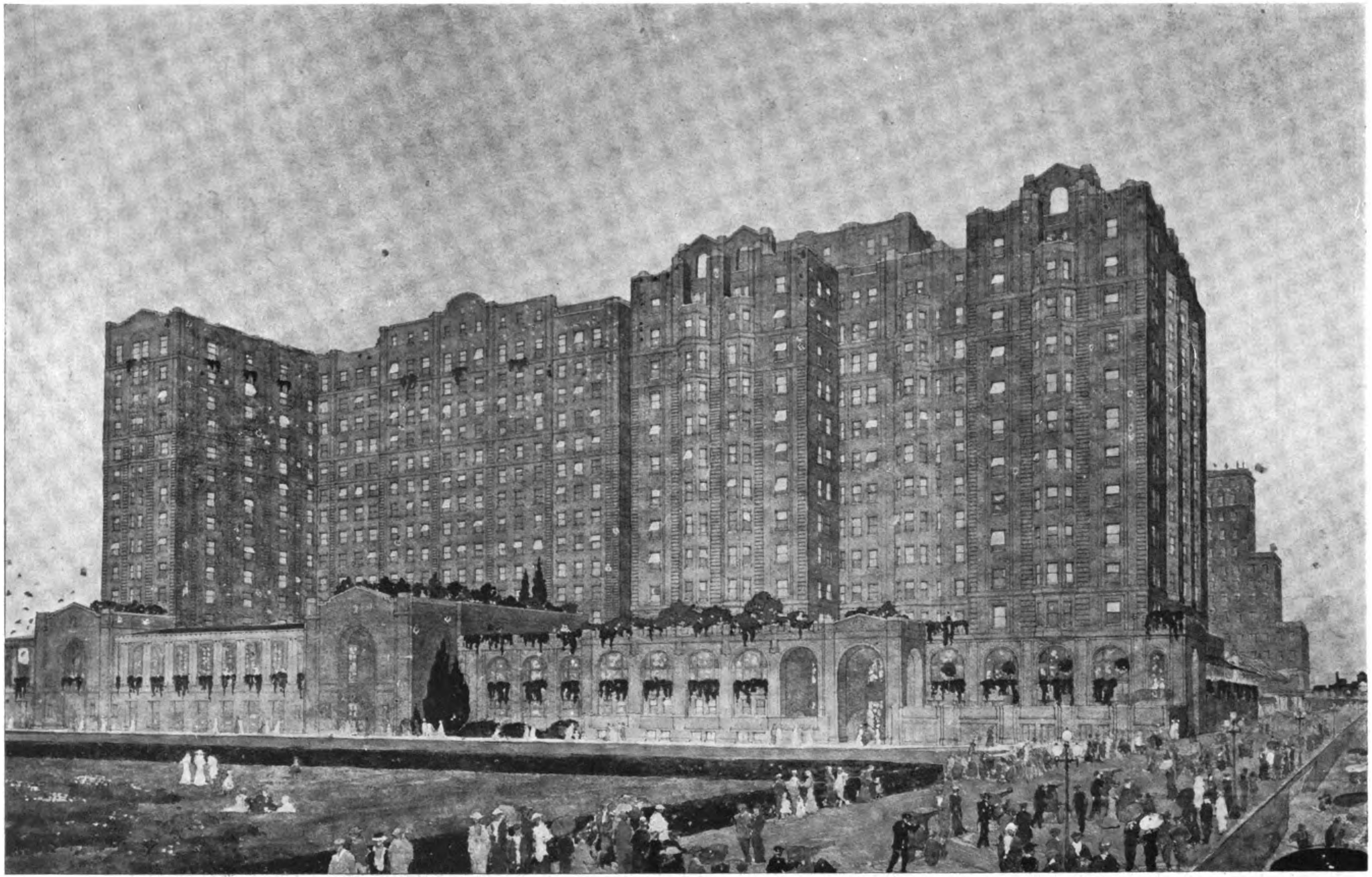
All apparatus in each department is the most up-to-date obtainable and the entire studio is laid out with the idea of obtaining the best possible results in the production of pictures.

The new laboratory building adjoins the studio and is equipped to develop and print all of the pictures produced in the Eastern studios. This separate structure will contain the largest part of the films at all times and removes the hazard of this work from the studio building.

In addition to office space and a complete research laboratory, this building contains two separate and distinct laboratories. In the first story a machine developing system was installed under the supervision of the Spoor-Thompson Company. Six of their latest type machines give a capacity of 30,000 feet of finished film per hour and over 3,000,000 feet per week. These machines are interesting in that the unprinted positive film is inserted at one end of the machine and comes out at the opposite end thoroughly developed, washed, dried, polished and tinted, ready for shipment.

A trip through the laboratory is instructive, bringing out many facts not generally known about this branch of the industry.

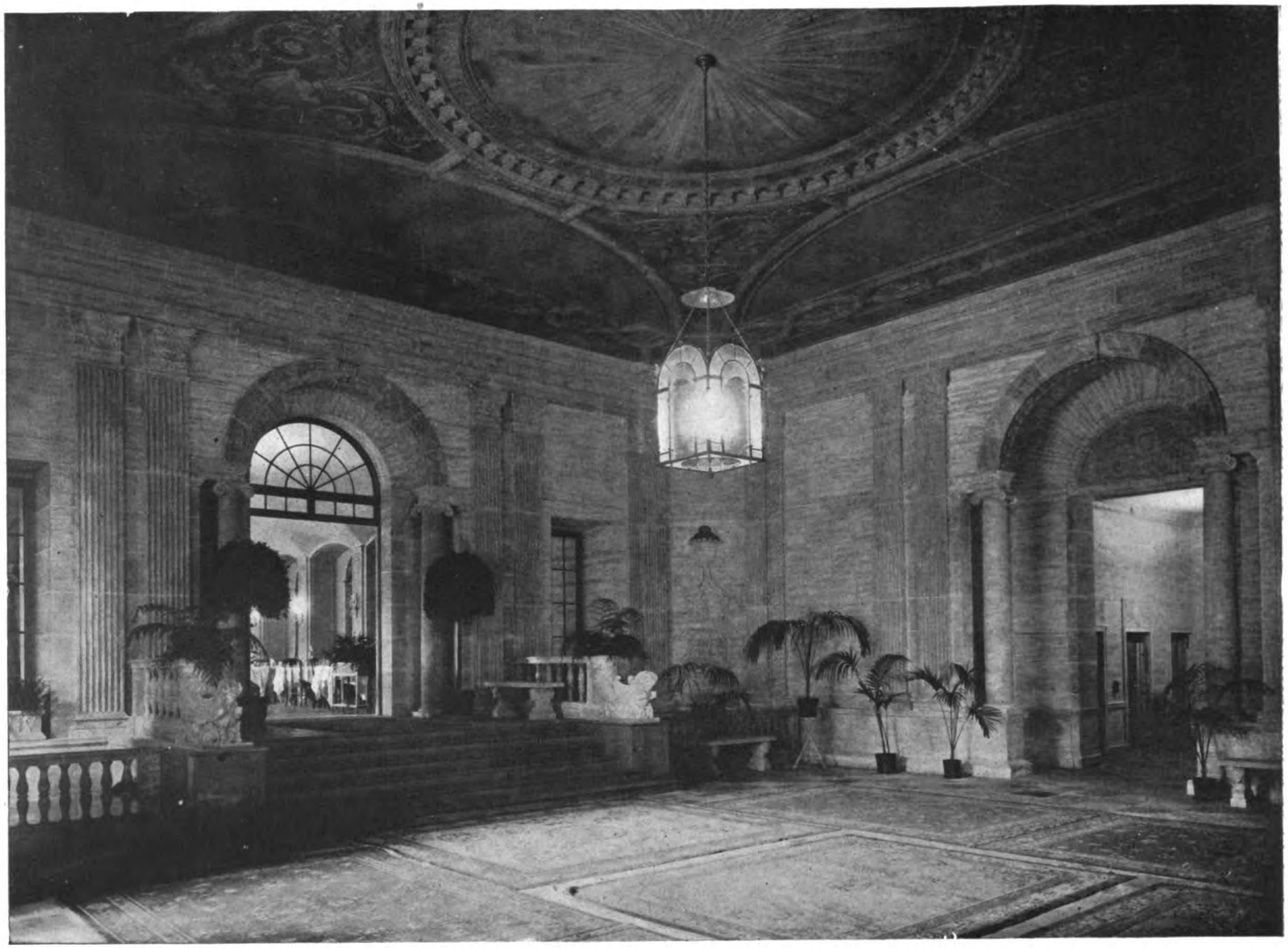
The negative of each scene made in the studio is unloaded from the camera and sent to the laboratory. Here it is developed and a sample print made of selected takes. This sample is sent to the director at the studio, and remains with the director until it is entirely cut and titles inserted in a manner satisfactory to him and the producing department. When the sample positive is thoroughly finished, it is returned to the laboratory, where the negative is cut



HOTEL AMBASSADOR, ATLANTIC CITY, N. J.
Warren & Wetmore, Architects.

Architecture and Building. Plate 84.

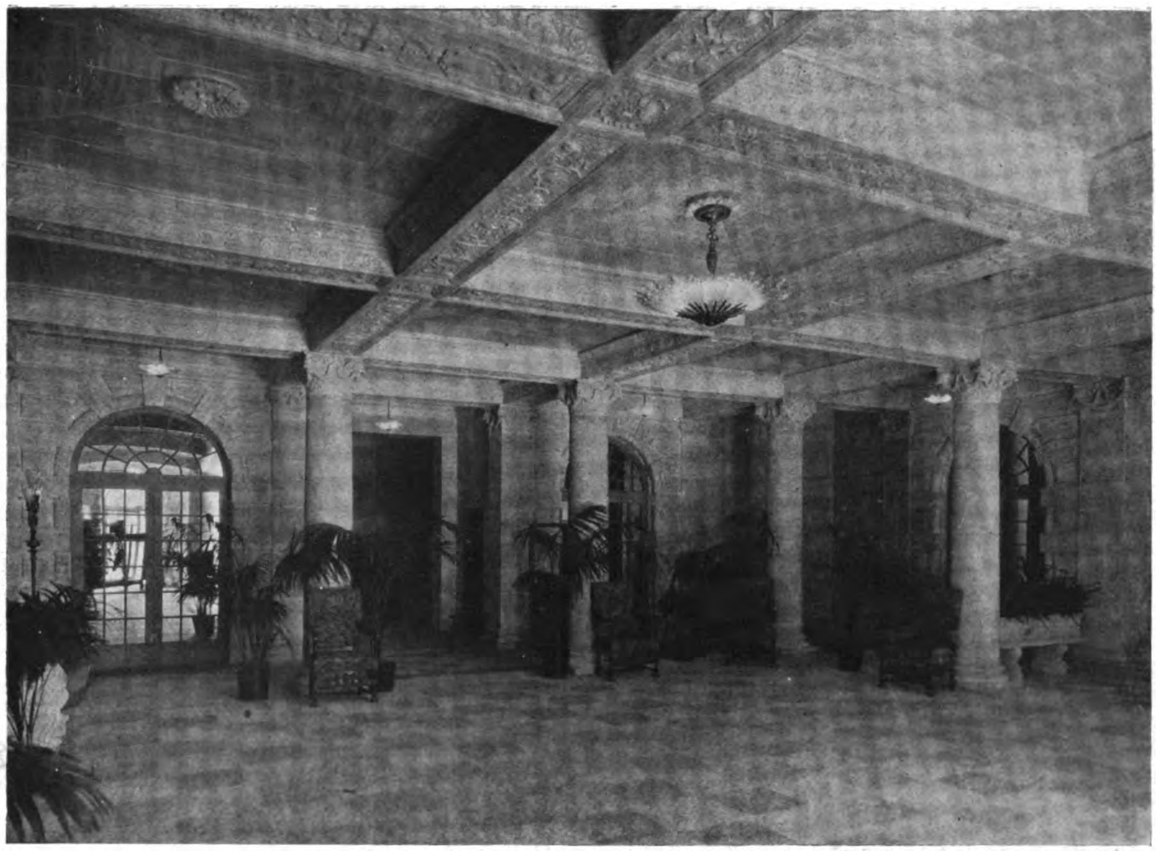
Built by Thompson-Starrett Co.; terra cotta partition blocks—Phillips-Harper Co.; pyralin closet seats—C. F. Church Mfg. Co.; brick—Somers Brick Co.; plumbers—W. G. Cornell Co.; hot water service heaters and swimming pool heaters built by the Whitlock Coil Pipe Co.; wrought iron pipe made by Reading Iron Co.; watchman's clocks—Newman Clock Co., Inc.; plumbing fixtures—J. D. Johnsou Co., Inc.; waterproofing—Storm Waterproofing Corp.



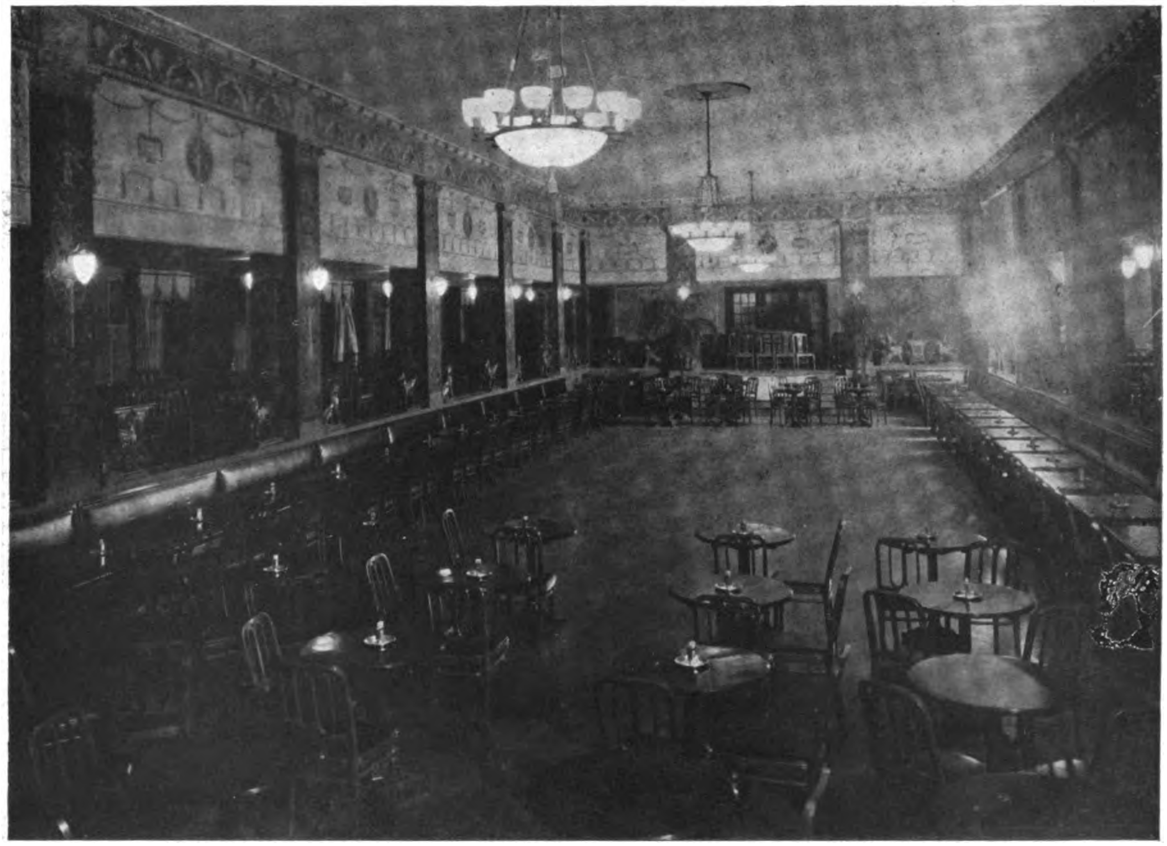
MAIN FOYER, NEW ANNEX, HOTEL AMBASSADOR, ATLANTIC CITY, N. J.
Warren & Wetmore, Architects.

ARCHITECTURE AND BUILDING. Plate 85.

Built by Thompson-Starrett Co.; interior furnishings—John Wanamaker; **decorating—Cooper, Sampietro & Gentiluomo; paints made by Detroit Graphite Co.; marble—Brooklyn Steam Marble Co., Inc.**



FOYER LEADING TO POMPEIAN GRILL, NEW ANNEX, HOTEL AMBASSADOR.

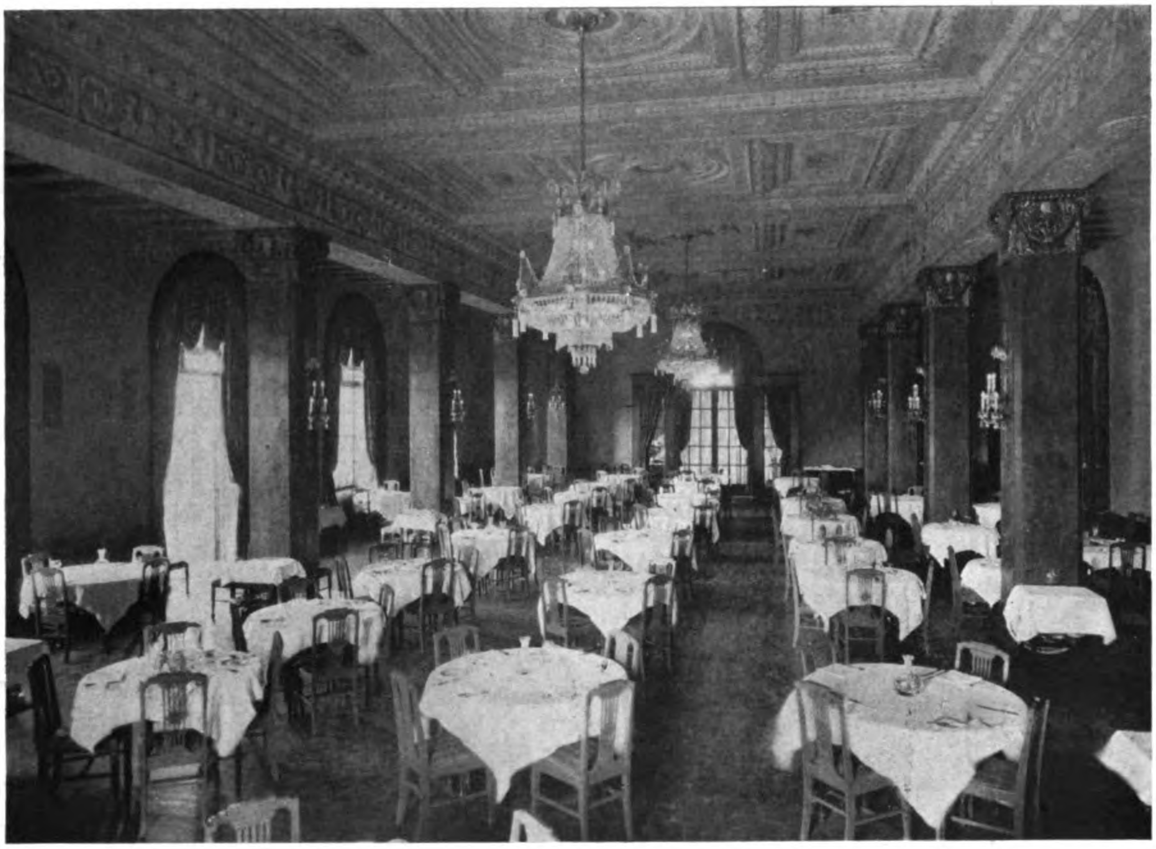


POMPEIAN GRILL, NEW ANNEX, HOTEL AMBASSADOR,
ATLANTIC CITY, N. J.

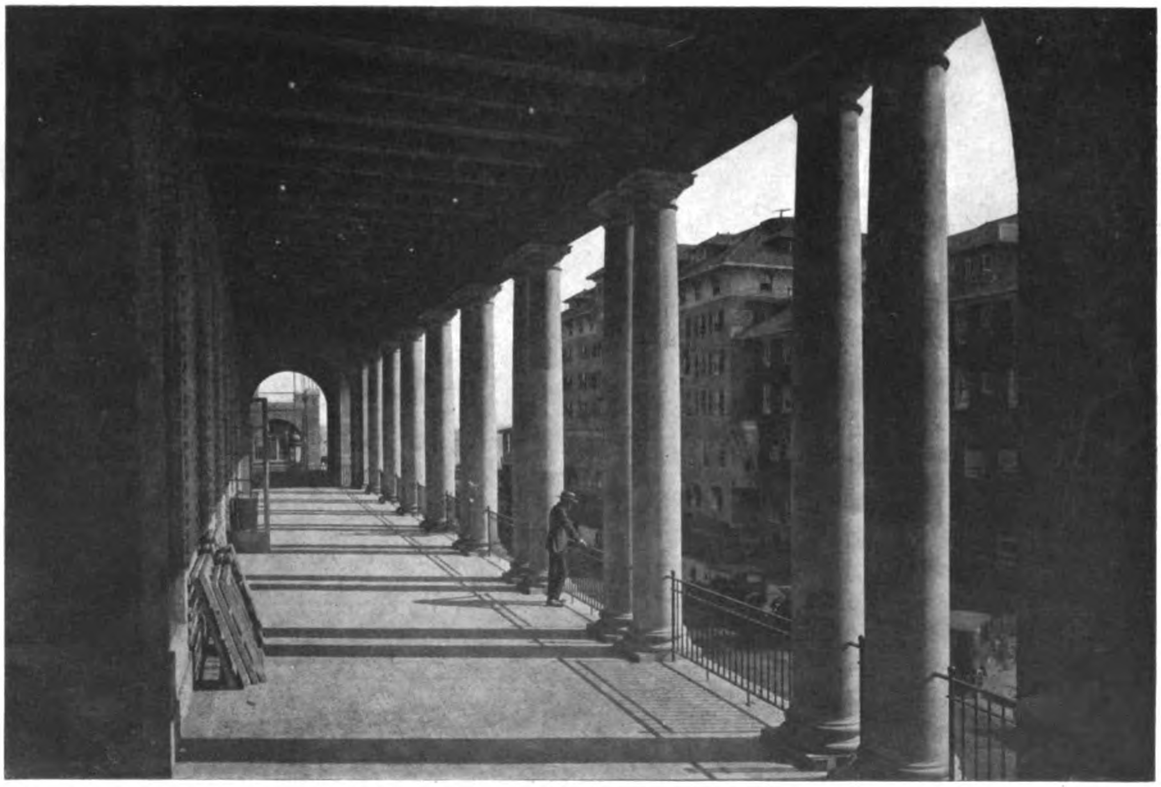
Warren & Wetmore, Architects.

Architecture and Building. Plate 86.

Built by Thompson-Starrett Co.; decorating—Cooper, Sampietro & Gentiluomo; paints made by Detroit Graphite Co.; fire alarm boxes and gongs—Atlantic City Auxiliary Fire Alarm Co.



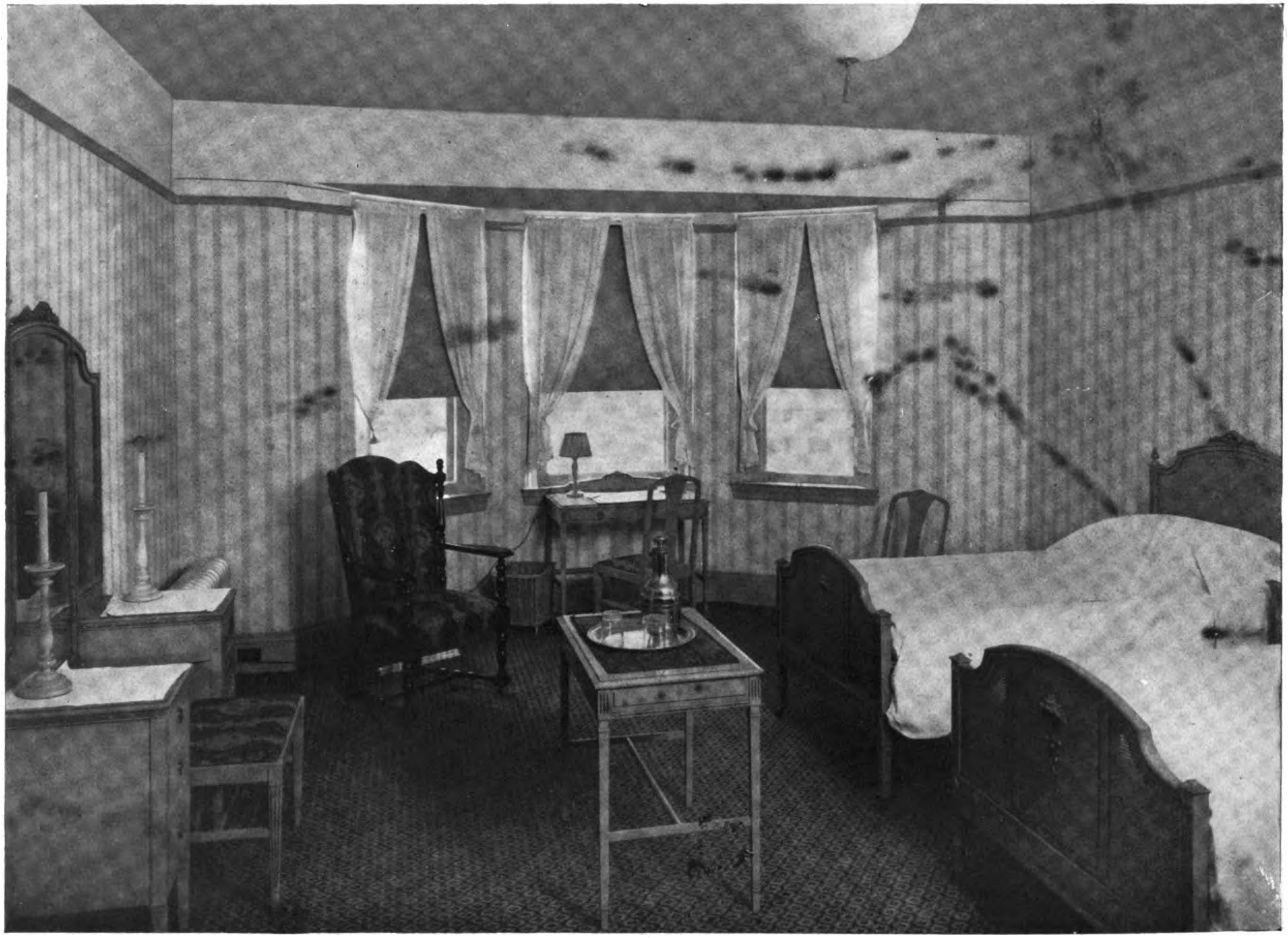
AMERICAN PLAN, DINING ROOM, NEW ANNEX, HOTEL AMBASSADOR



PORTION OF THE SUN DECK--NEW ANNEX, HOTEL AMBASSADOR, ATLANTIC CITY, N. J.

Warren & Wetmore, Architects.

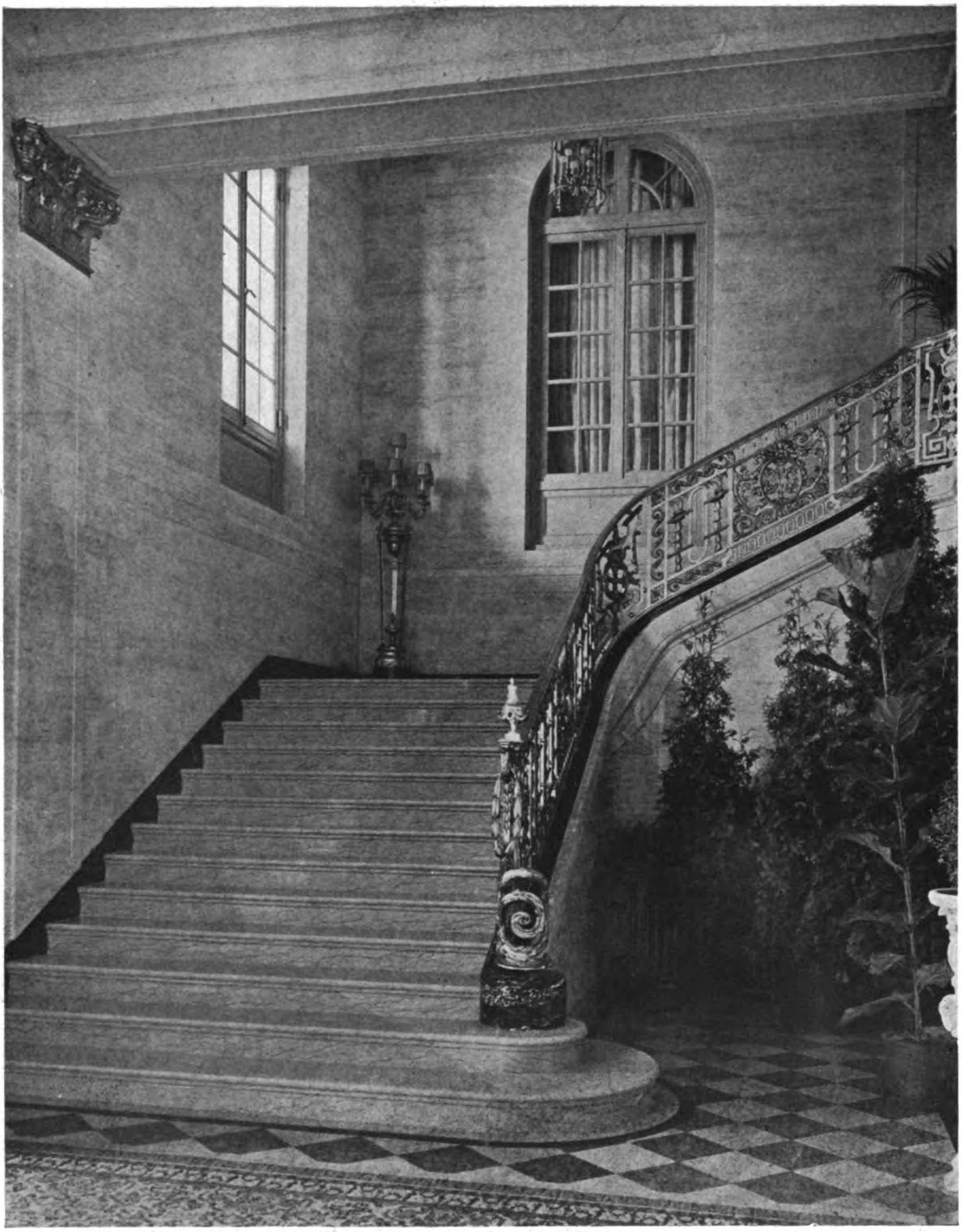
ARCHITECTURE AND BUILDING. Plate 87.
Decorating—Cooper, Sampietro & Gentiluomo; paints made by Detroit Graphite Co.



TYPICAL BEDROOM, NEW ANNEX, HOTEL AMBASSADOR,
ATLANTIC CITY, N. J.

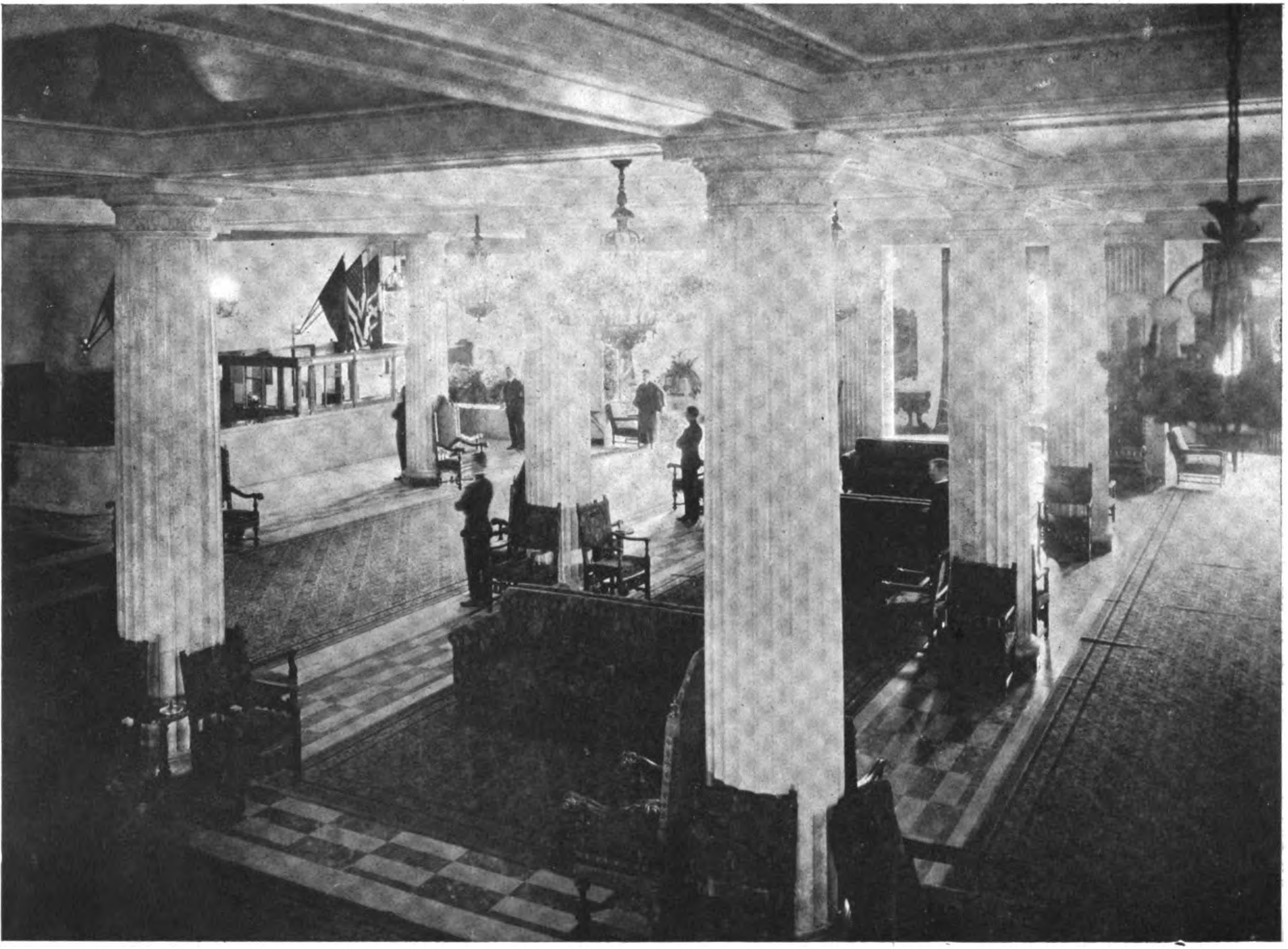
Warren & Wetmore, Architects.

Keystona used on walls.



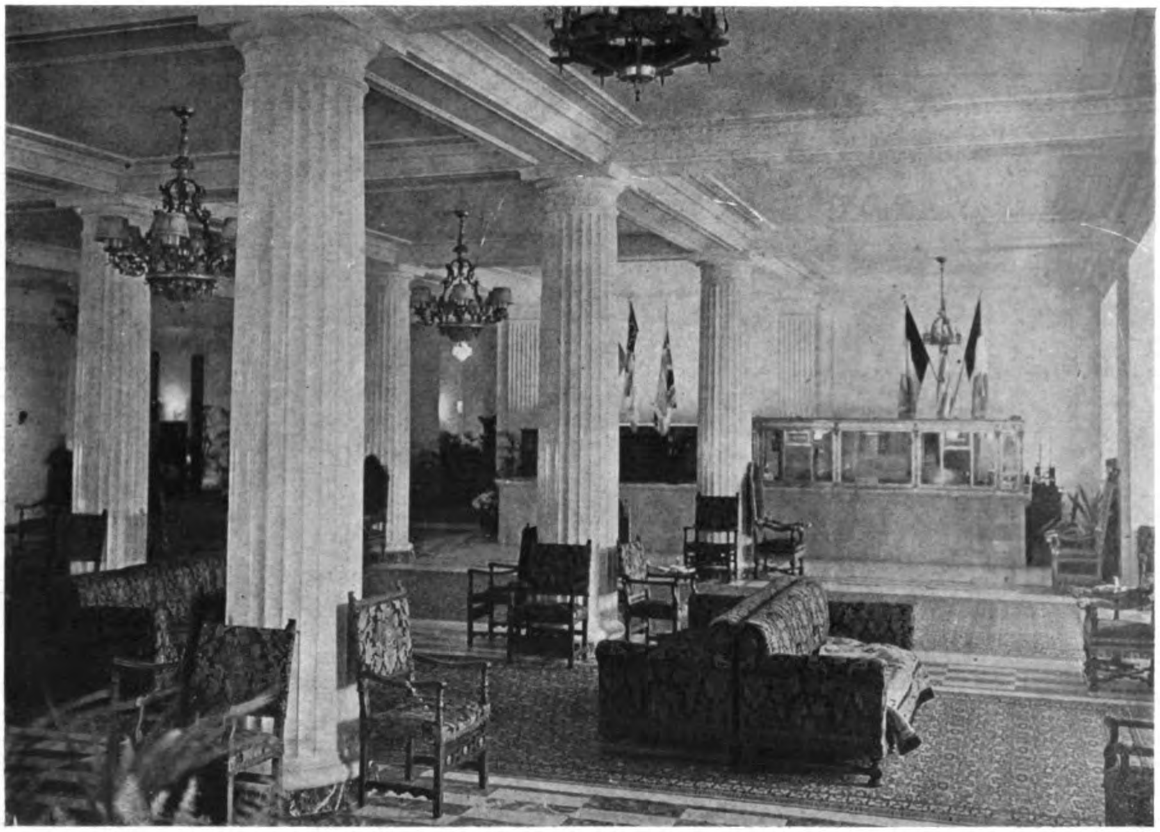
GRAND STAIRCASE LEADING FROM ENTRANCE TO MAIN LOBBY, ORIGINAL PART, HOTEL AMBASSADOR, ATLANTIC CITY, N. J.

Electrical contractors—Baird-Osterhout Co.

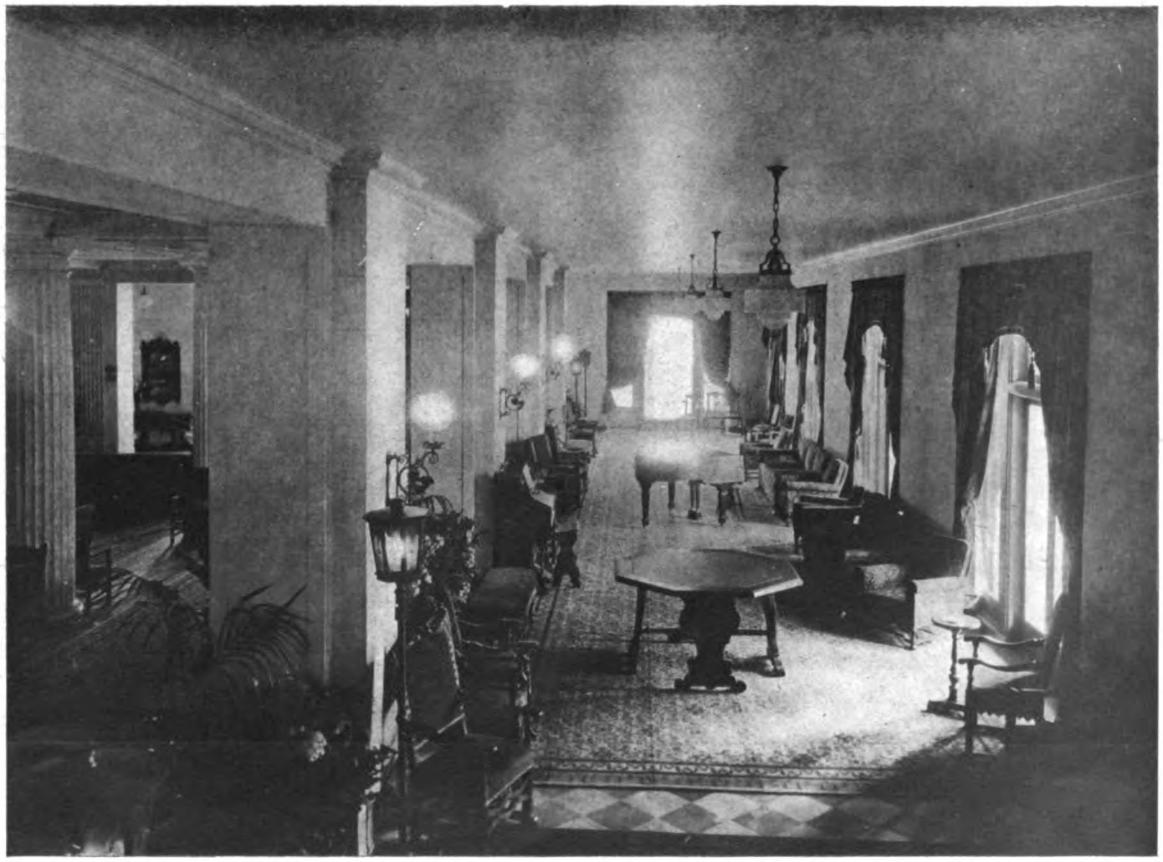


MAIN LOBBY, ORIGINAL PART, HOTEL AMBASSADOR, ATLANTIC CITY, N. J.

ARCHITECTURE AND BUILDING. Plate 90.
Interior furnishings—Gimbel Bros.; furniture made by Shaw Furniture Co.; bulletin boards—U. S. Changeable Sign Co.; Frink reflectors used.

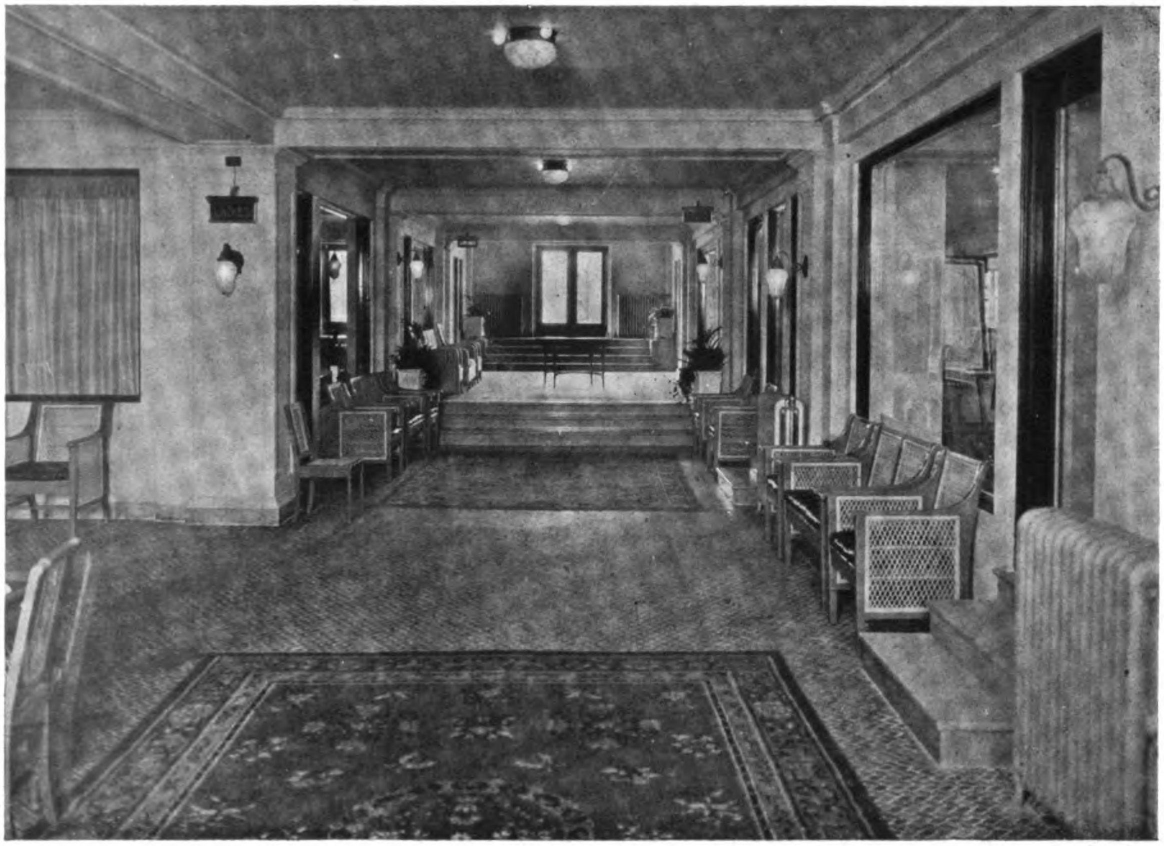


PORTION OF LOBBY, ORIGINAL PART, HOTEL AMBASSADOR.

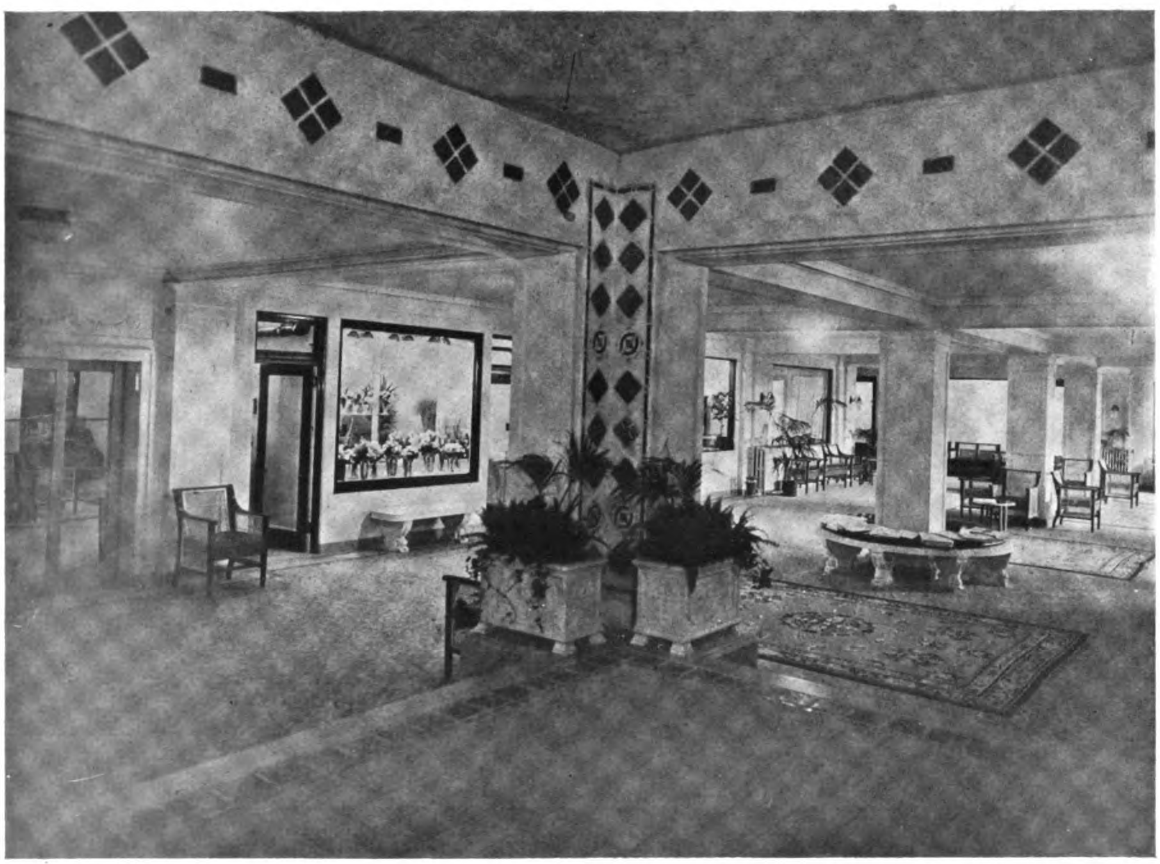


SIDE VIEW OF LOBBY LEADING TO UPPER DECK, ORIGINAL PART, HOTEL AMBASSADOR, ATLANTIC CITY, N. J

Electrical contractors—Baird-Osterhout Co.

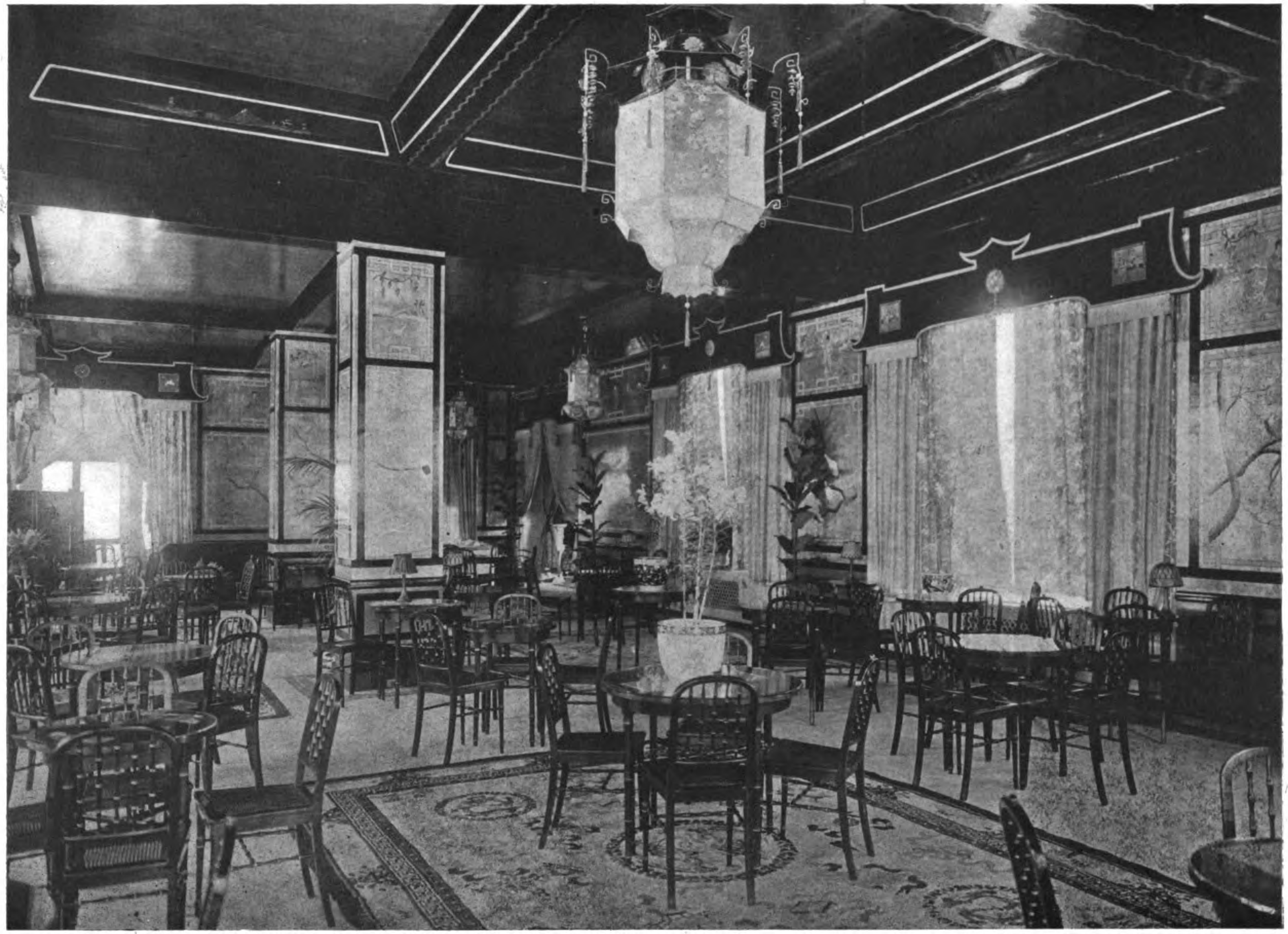


LOUNGING ROOM, ORIGINAL PART, HOTEL AMBASSADOR.

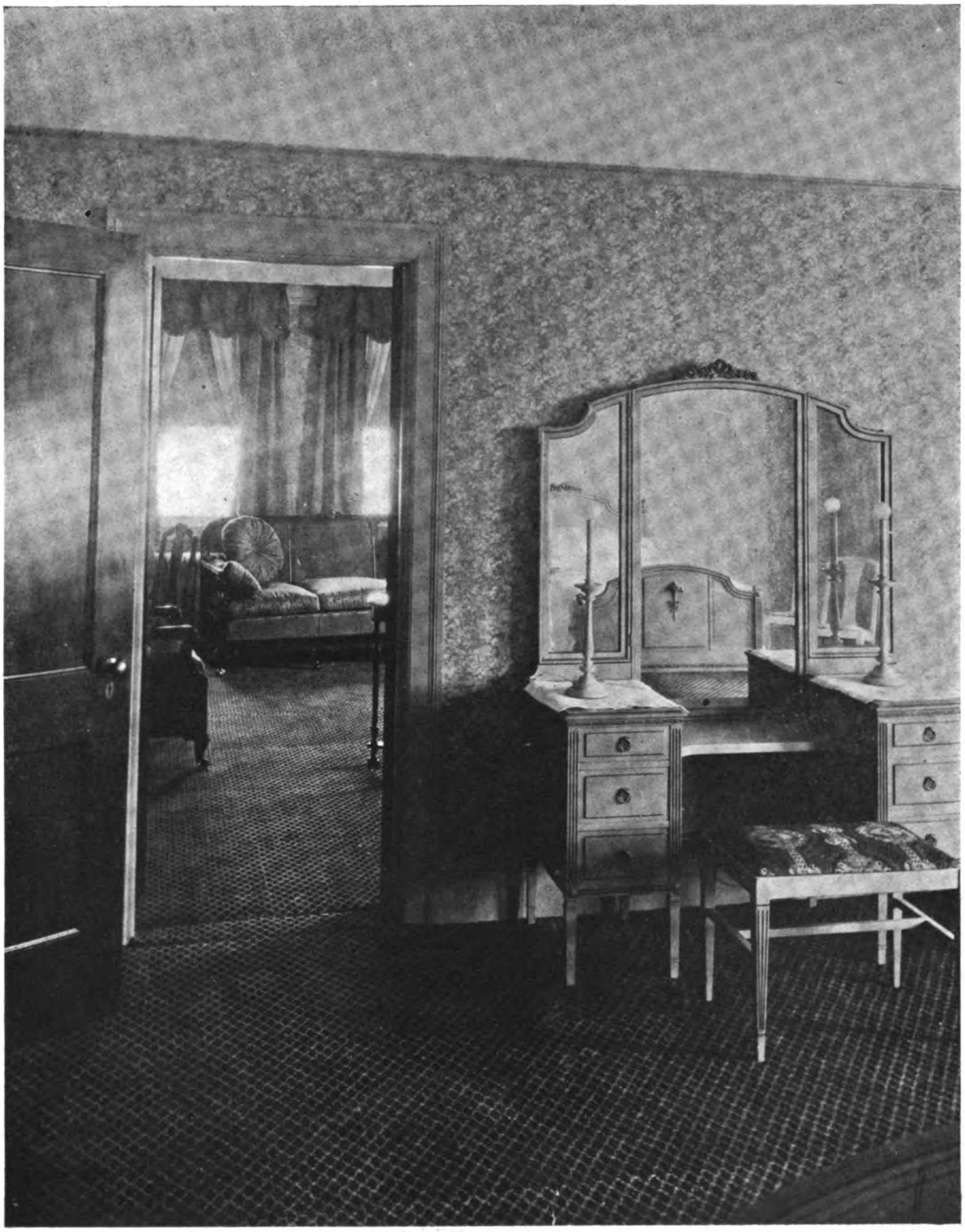


LOWER LOBBY, ORIGINAL PART, HOTEL AMBASSADOR,
ATLANTIC CITY, N. J.

Insulated wire—Bourn Rubber Co.

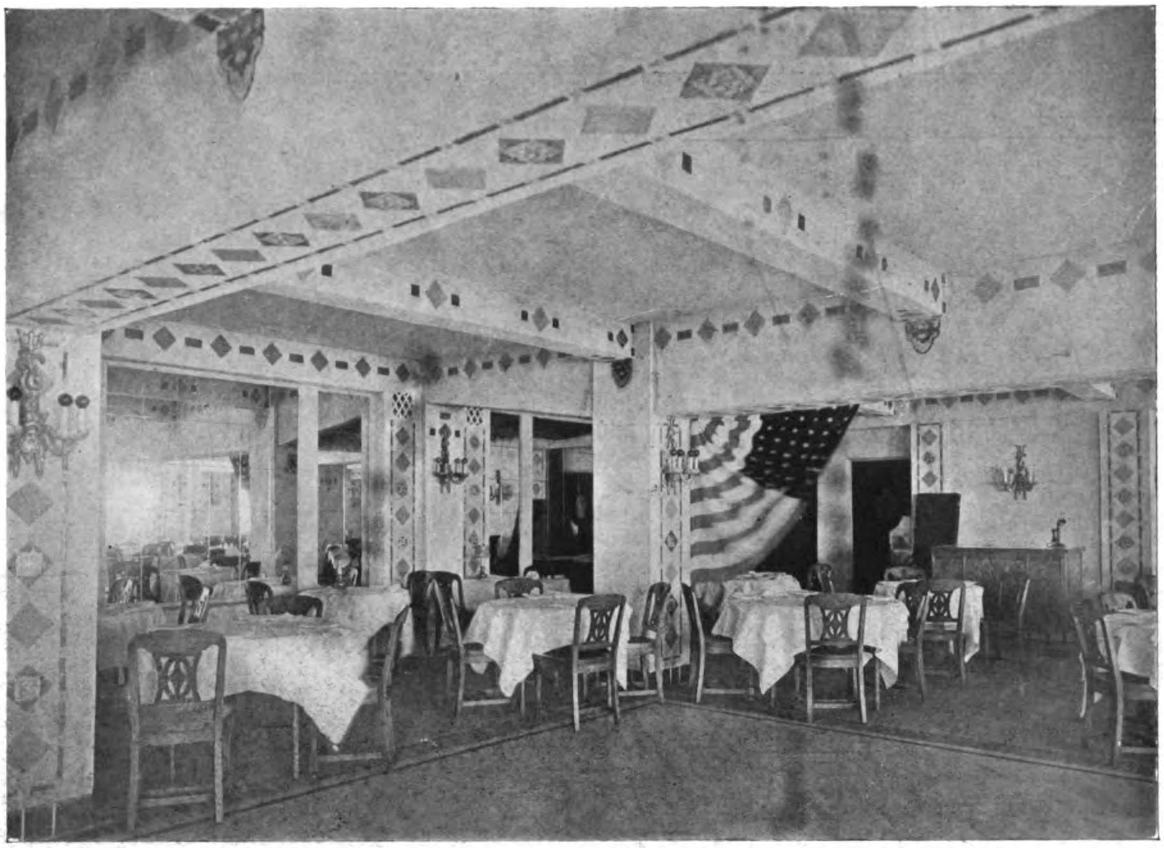


JAPANESE TEA ROOM, ORIGINAL PART, HOTEL AMBASSADOR,
ATLANTIC CITY, N. J.

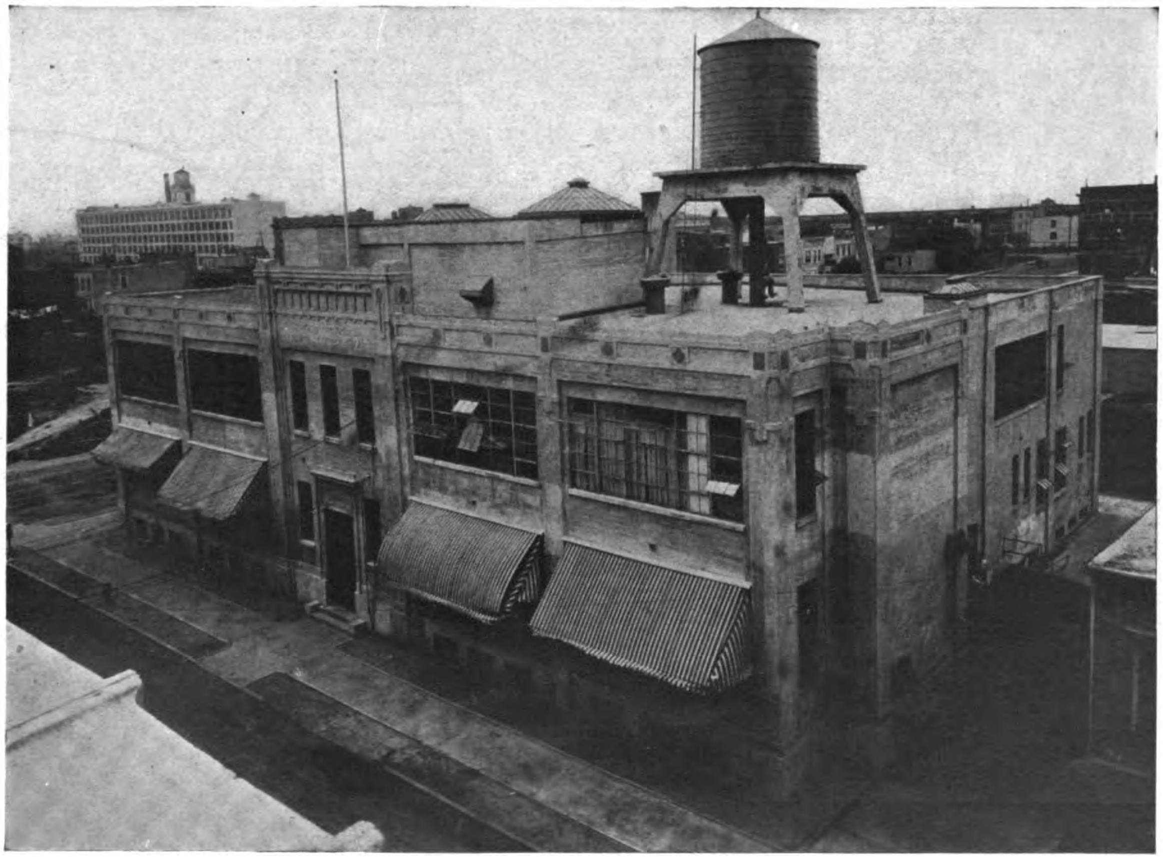


BEDROOM SUITE, ORIGINAL PART, HOTEL AMBASSADOR,
ATLANTIC CITY, N. J.

ARCHITECTURE AND BUILDING. Plate 94.
"Impaco" flat wall paints furnished by Imperial Paint Co.



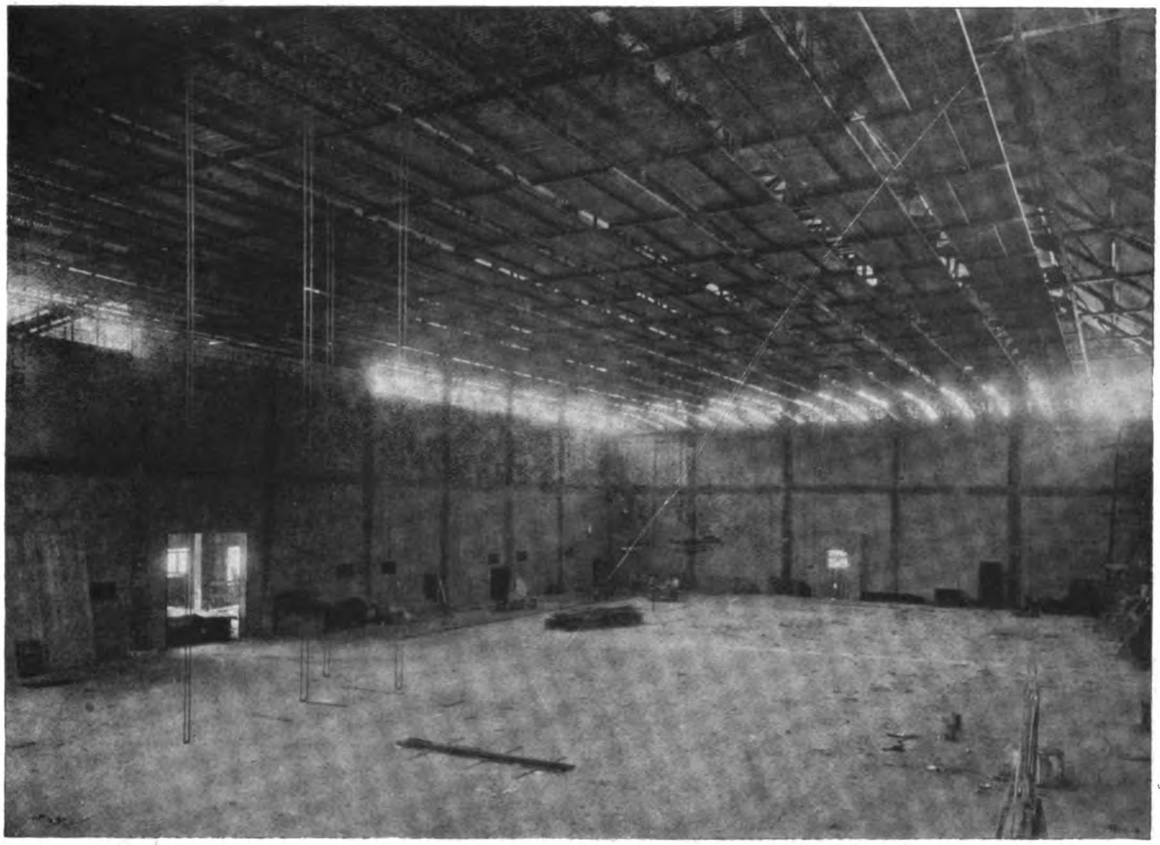
THE GRILL, ORIGINAL PART, HOTEL AMBASSADOR.



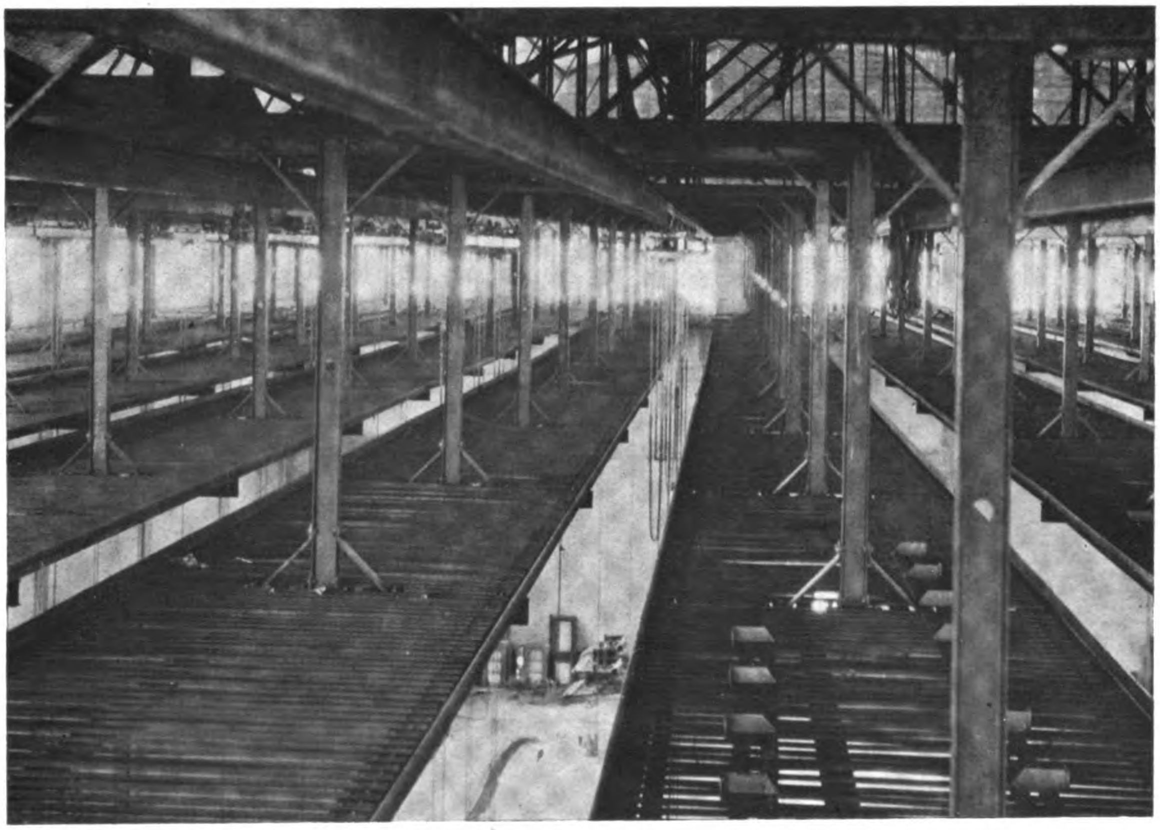
LABORATORY BUILDING FOR THE FAMOUS PLAYERS-LASKY CORPORATION, LONG ISLAND CITY, N. Y.
Fleischmann Construction Co., Engineers and Architects.

ARCHITECTURE AND BUILDING. Plate 95.

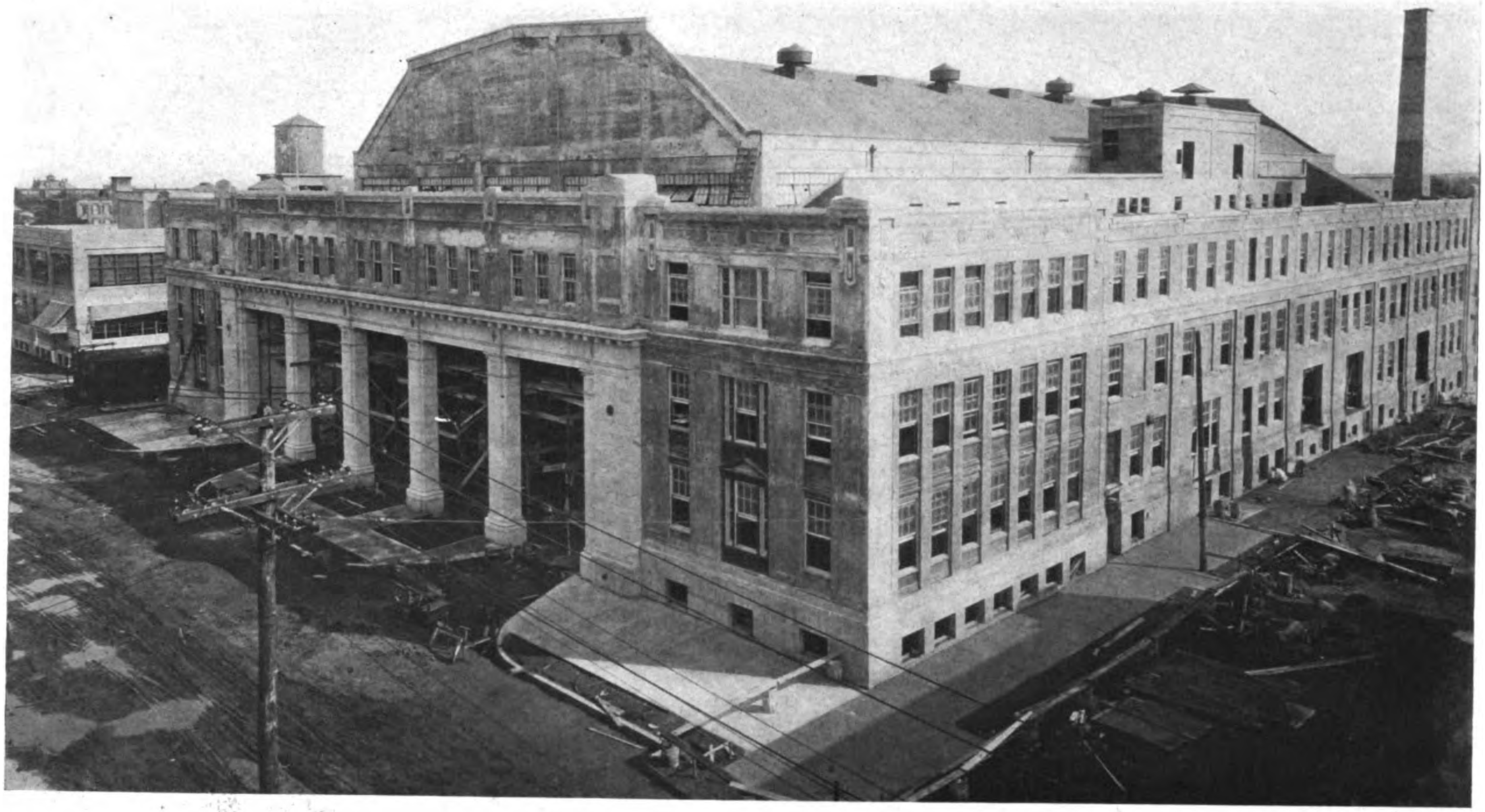
Night watchman and fire alarm service—American District Telegraph Co.; plumbing —Weber & Hamilton, Inc.; ornamental iron—Sexauer & Lemke, Inc.



MAIN STUDIO FLOOR, STUDIO BUILDING.



OVERHEAD FOOT WALKS ABOVE MAIN STUDIO, STUDIO BUILDING FOR THE FAMOUS PLAYERS-LASKY CORPORATION, LONG ISLAND CITY, N. Y.
Fleischmann Construction Co., Engineers and Architects.

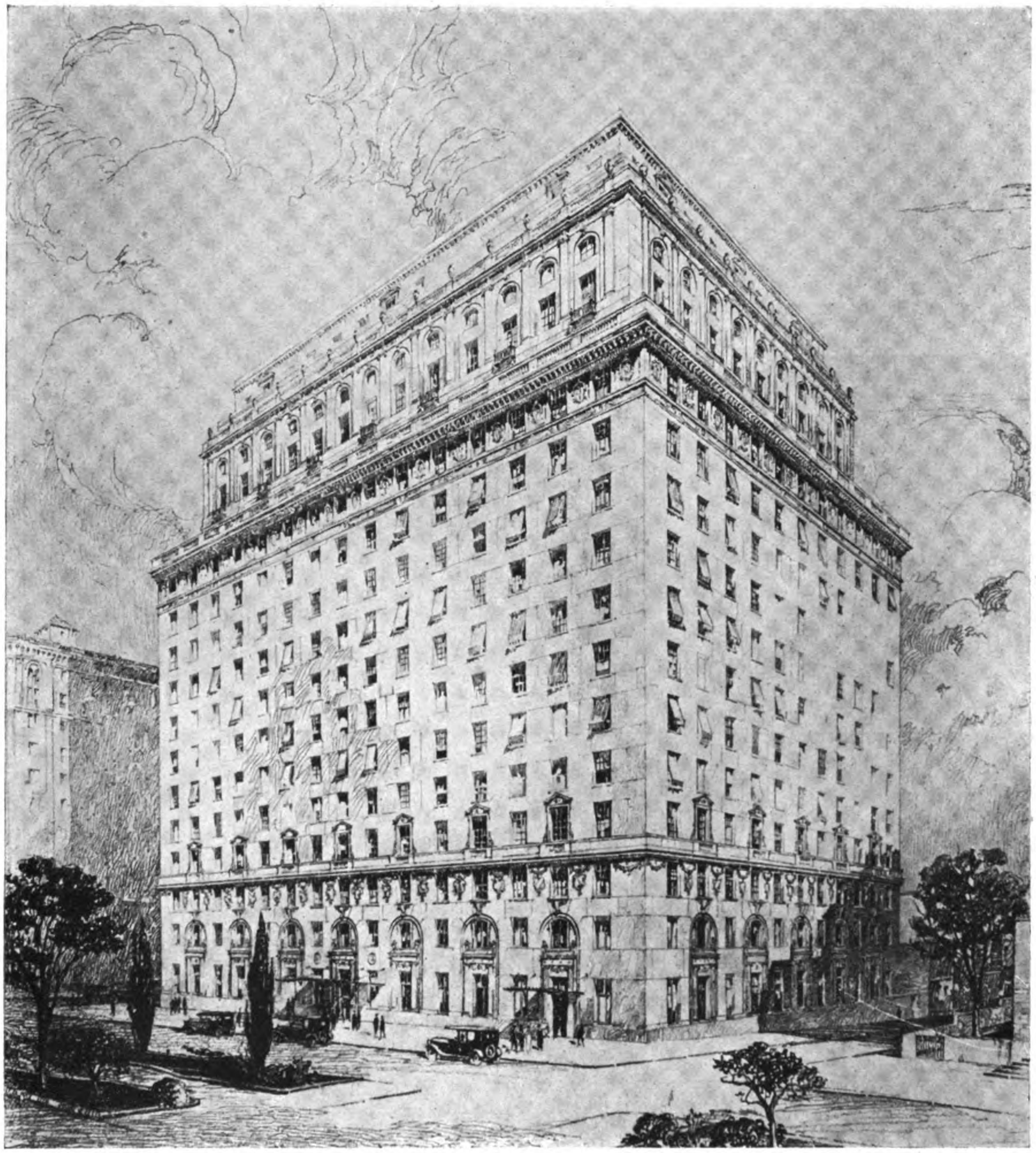


STUDIO BUILDING FOR THE FAMOUS PLAYERS-LASKY CORPORATION, LONG ISLAND CITY, N. Y.

Fleischmann Construction Co., Engineers and Architects.

ARCHITECTURE AND BUILDING. Plate 97.

Moving picture machines—Precision Machine Co.; plastering contractors—Frank Morell Co., Inc; elevators—Watson Elevator Co.; elevator door hangers—Richards-Wilcox Mfg. Co.

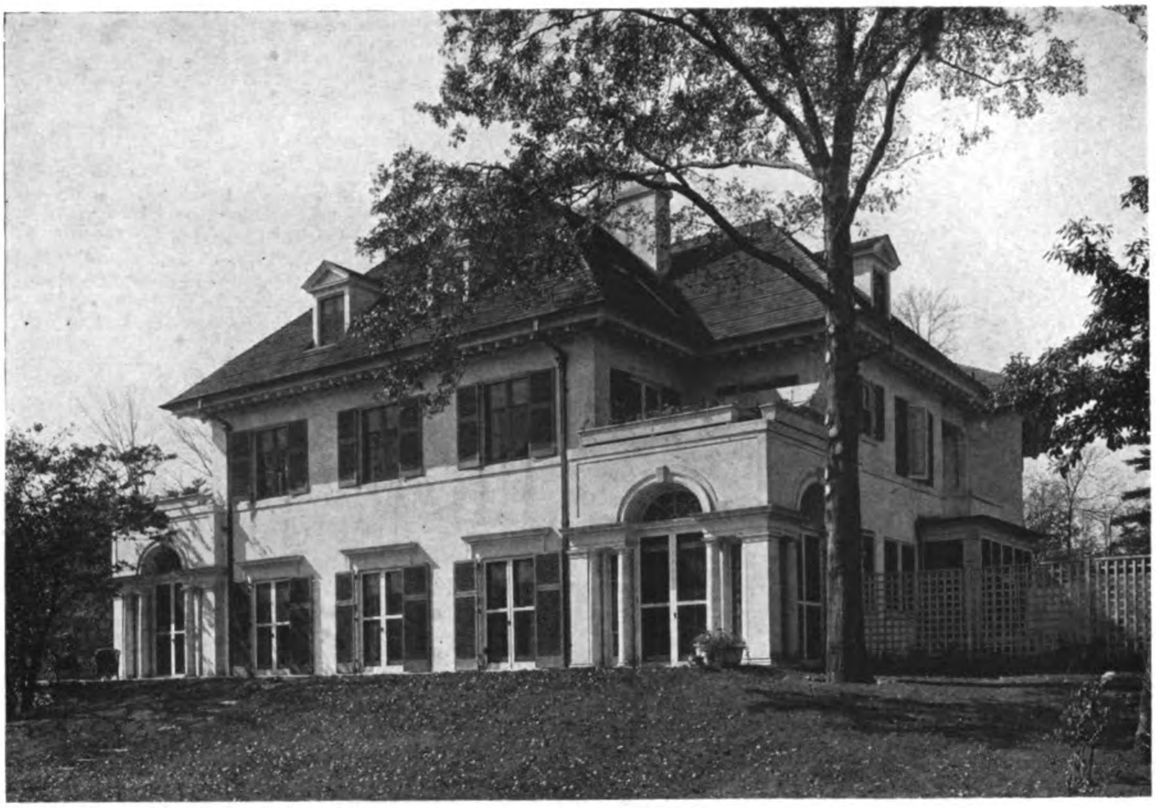


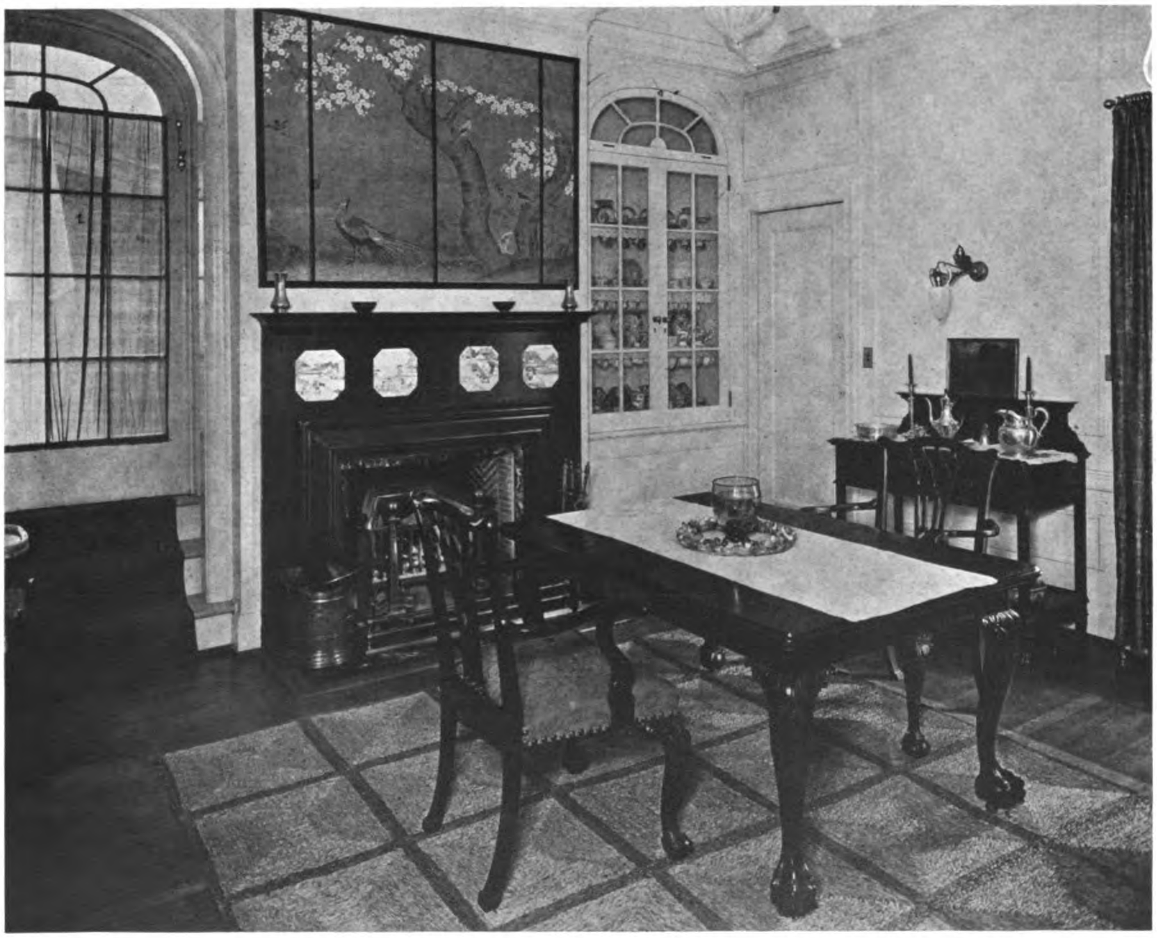
HOTEL AMBASSADOR, PARK AVENUE AND FIFTY-FIRST STREET, NEW YORK CITY.

Warren & Wetmore, Architects.

ARCHITECTURE AND BUILDING. Plate 98.

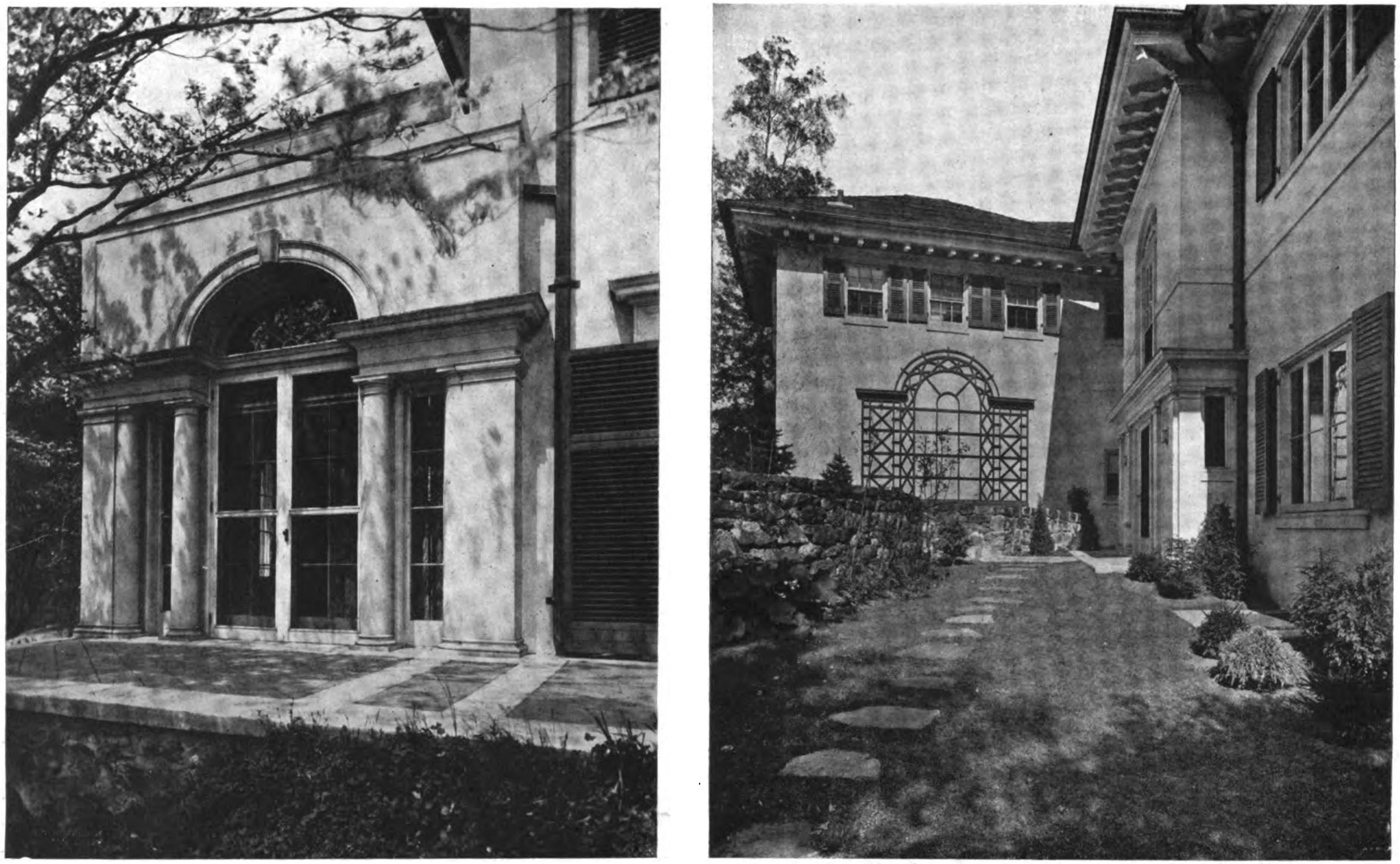
Built by Thompson-Starrett Co.; plastering contractors—P. J. Durcan, Inc.; painting—The Barker Painting Co.; metal lath—Charles F. Scammel Co.; Marsh reinforced packless radiator valves and extension handles used on radiators; cut cast stone—Benedict Stone Corp.





RESIDENCE OF MR. J. M. R. LYETH, RIVERDALE-ON-HUDSON, NEW YORK.
Dwight James Baum, Architect.

ARCHITECTURE AND BUILDING. Plate 99.
Built by Kenneth Mackay & Co.



DETAILS, RESIDENCE OF MR. J. M. R. LYETH, RIVERDALE-ON-HUDSON, NEW YORK.

Dwight James Baum, Architect.

ARCHITECTURE AND BUILDING. Plate 100.
Built by Kenneth Mackay & Co.

to match and the final titles inserted. From this completed negative the final positive prints are made which are shipped to the various exchanges.

Every modern convenience and mechanism for the work has been installed in this laboratory. Besides, there are sixteen vaults for the storage of film, laid out in sections of two each, with a good-sized workroom between. This makes it possible to store and care for vast quantities of negatives.

An air conditioning plant, a most necessary adjunct of film production, has been installed in this laboratory, which makes it possible to keep the temperature and humidity at any point desired. It is thus expected to keep the output of prints constantly up to 100 per cent. efficiency, so that 3,000,000 feet a week can be turned out regularly. Every foot of film will be thoroughly examined and it is expected that this laboratory will answer to the long-felt needs of this company for a higher class and a better quality of film.

In the second story the installation consists of the regular drum and tank arrangement where between 750,000 and 1,000,000 feet of film a week can be handled in addition to all the negative development and sample printing. A complete renovating department is provided where all films sent in by exchanges for correction will be received and examined. Films will be thoroughly examined, renovated, and new portions inserted where needed, and in this way exchanges will receive practically new prints to replace the old and worn out ones.

The Fleischmann Construction Company were the engineers and architects. The moving picture machines were supplied by the Precision Machine Co. Frank Morell Co., Inc., were the plastering contractors and Weber & Hamilton, Inc., did the plumbing work. The night watchman and fire alarm service was installed by the American District Telegraph Company. The ornamental iron work was done by Sexauer & Lemke, Inc. The Watson Elevator Co. installed the elevators and the elevator door hangers were supplied by Richards & Wilcox Mfg. Co.

THE ESSENTIALS OF THEATRE AND HOTEL DECORATIONS.*

There is cause for general gratification to be found in the growing appreciation of the importance and value of the position the decorator should be given in the planning of modern theatre and hotel structures.

Until recent years, and to a very great extent even today, this country was severely criticized for the general lack of consideration that was accorded mural art and decoration in the plan and construction of such public structures.

The common procedure of rushing the building to completion and striving for an early opening, without due regard to the elements necessary for a proper decorative plan, leaves much to be desired not only in the final effect but in the quality and character of the work from the technical viewpoint.

There are three broad essentials for the decorative scheme as applied to a theatre or hotel structure. First, the decoration must be borne in mind from the very inception of the design so as to coordinate the decorative embellishment with the interior construction; second, a sufficient period of time should be alloted for the actual execution of the decorative scheme so as to eliminate the too frequent necessity of sacrificing art for speed; and third, a matter which is in the hands of the decorator himself, an appreciation of the psychology of color and design and the resultant effect upon the public. The last essential is one on which emphasis may well be laid.

In spite of this there is much artistic work of high character done within most limited time and this is the result of combining in the decoration artistic instincts and experienced business methods which make for speed. Such craftsmen rely, and not without justification, on the splendor of effect that can be given by broad use of colors and tones. At the risk of a seemingly personal reference, what appears to be splendid examples of this treatment are shown in the New Capitol Theatre and the recently completed Ambassador Hotel at Atlantic City.

In the theatre and hotel it is, to the writer's mind, a vital adjunct, and even a commercial attribute, of any decorative scheme, to so affect the spectator, at his very entrance, as to produce a psychological effect that will throw him, unconsciously, into a more or less receptive, or at least meditative mood. While to ascribe to a decorative plan such a purpose may to some appear far-fetched, it has from careful and scientific analysis been positively demonstrated, and that phase of the decorator's work provides a field of endeavor that is fertile for his advancement in the commercial realm—a realm with which he is too often entirely disassociated.

The psychological effect attainable by the decorative scheme, in the theatre, for instance, was aptly expressed by an eminent critic shortly after the auspicious opening of the new Capitol Theatre. "The spectator," he commented, "enters a vaporous atmosphere, rather than a building, so that the mind is diverted from the very idea of structure. One enters in the dusk of evening and views its beauties, with its mysterious lights and shades, its glowing colors and impressive tones, and gazes upon, with rapt attention, the unfolded scene."

To the credit of the architect it should be said that he too almost instinctively has consistently realized the importance, value and even utility of the decorator, particularly in public structures of the character mentioned, but for the most part has been compelled to relegate him to the rear, through commercial considerations of the building as a whole.

Fortunately, such relegation is waning and to promote and foster a proper consideration and appreciation of his place the decorator must take advantage of every opportunity to reflect a business asset in the part his work is to play.

With the revival of painting and the more careful study of form and composition, not yet of light and shade, the decorator entrusted with decoration no longer having the glamour of gold in which to rely, must realize that his own work supplements that of the architect, and must not for an instant lose sight of the fact that the effect as a whole is the vital consideration. He must be careful not to disturb the lines of the building, for if he works in pure strong colors and care is not exercised, this may be easily done and the harmony of the work of the architect and decorator destroyed.

A. Lincoln Cooper.

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* By A. Lincoln Cooper, Instructor of Mural Decoration in the N. Y. School of Industrial Art.

THE CONCRETE HOUSE AND ITS STATUS AS REGARDS BUILDING CODES.*

Almost without exception, every man is interested in the subject of house building. But this unmistakable interest is only the beginning. The house must be designed and built, and our interest must evolve into action. At the very start, we decide what kind of a house we are going to build, and choose our building material. On this choice, as well as on the quality of workmanship, much will depend.

By studying the art of house building, we discover that the most successful houses do not depend upon ornament nor any particular kind of material for their success, but rather upon good lines, simplicity, and reasonableness.

Any building worthy to be called a house should be built of enduring material, and with proper care should serve three or more generations. Whether the material is wood or concrete, the thought of durability should always be engrossing if not paramount.

Much time and thought have been given to the study and examination of building materials. All have their virtues, their limitations and defects. But we are now considering the house of concrete.

Before a house or other building can be erected in any of our cities, an application for a permit to build must be made, a plan must be filed, also a written statement describing the character, materials, use, and location of such building—all showing the purpose of the builder to comply with the requirements of the state and local building laws.

Let us examine briefly the building laws or codes of some of our larger cities, so as to learn, if possible, their various regulations and restrictions as they apply to and affect the concrete house.

I have tried to condense a dozen typical existing codes, retaining only the salient features, reducing them to their simplest terms, and recording their actual mandatory requirements.

Only high grade Portland cements are considered in any of the building codes referred to.

An accompanying table will help to visualize the differences in requirements of the cities chosen for comparison.

In designing the concrete house, safety and economy must be reconciled.

If to embed the steel reinforcement 1½ or 2 inches is sufficient to protect it from fire in a storehouse, or other commercial building, where large quantities of inflammable materials are housed, then ½ inch of fire protection should be enough when the steel is embedded in the concrete walls and floors of a small house where none of the rooms would contain more than a few armfuls of combustible furnishings.

Where crushed slag is procurable, it might well be substituted for crushed stone in concrete for use in dwelling houses.

Cinders are variable in their structural and chemical properties, but their use in construction work in small buildings might be permissible in localities where other material is difficult to procure, or where they can be obtained in a relatively uniform and clean condition. They should be crushed and screened and free from ashes.

Building codes should require every maker of concrete block to have a suitable building or enclosure for protection from cold, heat, winds and weather, where he shall properly make and cure his block. Licenses should be issued to all blockmakers, such licenses to be revocable for causes set forth in the code.

In considering the codes which I have mentioned, it will be observed that the requirements are general and not specific. Alike to the warehouse a thousand feet long, and to the cottage—with partitions serving as diaphragms, extending in all directions, tying and bracing the whole structure every few feet.

The vertical supports and walls in large structures are designed principally with respect to their compressive strength, but the designer of a concrete house is not permitted to utilize any such economies.

As an illustration, a good reinforced concrete house, having horizontal dimensions of 30 by 40 feet and an average height above the basement of 20 feet, would weigh, including outside walls, floors, partitions and roof, approximately one hundred and fifty (150) tons, and if all the floors were loaded to their full carrying capacity of 40 pounds per square foot, it would add about 50 tons more. The weight of the whole building above the basement, together with its live load, could be safely supported upon one well designed concrete column, 23 inches in diameter. In the vertical supporting members in a typical concrete house, there is material sufficient to make twenty-five such columns.

Now this is extravagant designing—an unnecessary waste of valuable material. The designers are not encouraged to apply their inventive genius or even the best of their training and experience, but in many cases are restrained and handicapped by the requirements of existing building codes—codes that are influenced by other codes, which in turn are influenced by older and different methods of building. There is no logical reason why concrete construction should be measured in multiples of 4, 8, or 12 inches—just because brick and stone are figured that way.

Portland cement concrete is a comparatively new material, and new uses for it are being discovered every day. Until very recently, the concrete house was designed on the same lines and with the same details as a brick or stone house. And it was but natural that existing or incongruous building regulations should be applied to it.

But we are progressing. The engineers have led the way, showing us how to build with concrete scientifically and safely. The factor of safety can be very greatly reduced when ignorance, dishonesty, and carelessness are noticeably reduced, and better controlled.

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* Reprinted from Proceedings of National Conference on Concrete House Construction, February 17-19, 1920. Paper by Fred W. Lumis, Building Commissioner, Springfield, Mass.

The men who are really responsible for our building codes have worked to get away from archaic methods, have had to oppose ignorance, perversity, and entrenched interests. They have had to arouse and mould public opinion, and receive its sanction before they could establish and maintain necessary reforms or enact building codes.

With a slight improvement in the intelligence and reliability of the average man, and a better and more universal understanding of the proper treatment and behavior of concrete in all places and under all conditions, great economies both in material and manipulation can be effected, and satisfactory results obtained.

Our building codes are primarily written and enforced for the dual purpose of protecting human life and the prevention of fire. They must occasionally be revised, so as to comprehend new materials and new methods.

The concrete house of various types will gradually and shortly come to be considered on its own intrinsic merits, and building codes will contain provisions that will be specially applicable to such houses.

The concrete house, with its unlimited opportunities for style, finish and decoration has a value and a charm all its own. The designer should bear in mind that he is expressing himself in terms of concrete, and also that it is a medium worthy of his best thoughts and his noblest effort.

BUILDING CODE REQUIREMENTS

City	Steel Stresses per sq. inch		Concrete Stresses per Sq. Inch			Concrete Mixture	Thickness of Walls	Miscellaneous
	High Carbon	Mild	Extreme Fiber	Compression				
				Mass Concrete	Columns			
Boston	16000		500	350	600 vertical and hooped rein.	1:2:4	Basement—12″ 1st and 2d stories—8″	May use cinders in floor slabs, roof or filling
Bridgeport	16000	14000	600	450		Must Withstand 2000# at 28 days	Not less than 12″ or same as brick	Slag or clean furnace clinkers permitted
Buffalo	16000	16000	500	350		1:2:5	Same as brick	
Chicago		18000	35% of ultimate crushing strength	20% of ultimate crushing strength		1:1:2—2900* 1:1½:3—2400 1:2:4—2000 1:2½:5—1750 1:3:7—1500	Same as brick	Cinders permitted except in bearing walls, columns or piers
Cincinnati	16000	16000	600 700 800	500 600 700		1:2½:5 1:2:4 1:1½:3	Reinforced — not less than 4″ Reinforced basement walls—12″ 1st and 2d stories —8″	Cinder concrete in floor arches or slabs only
Detroit	18000	16000	650	450		Walls, beams and floor — 1:2:4 Columns 1:1½:3	Reinforced—66% of that required for brick. Plain—Same as brick	Slag permitted in walls and slabs. Boiler cinders prohibited
Hartford	80000 (ultimate)	60000 (ultimate)	800	500	850 hooped rein.	1:2:4	For houses: Basement — 12″ 1st and 2d stories —8″	1:2:4 cinder concrete allowed at 50% of values given.
Los Angeles	16000	16000	650 520	 350 250 no rein.	800 hooped rein.	1:2½:3½ crushed rock 1:3:4½ screened gravel 1:7 bank or river gravel	Reinforced — not less than 8″ Plain and block —same as brick	
Louisville	16000	16000	650	650	450—vertical rein. only 540—hoops only 650—1 to 4% vert. rein. and hoops	1:2:4	12″ 1st story of one-story bldgs.—9″ Hollow block—10% less than brick or monolithic	Cinder concrete prohibited for construction work or fireproofing
Minneapolis	16000	16000	650	500† 208‡		1:2:4—must stand 2000 #	Basement — 12″ 1st and 2nd stories—10″	Cinder concrete not considered
New York	20000	16000	650	500 (plus 900 on vert. rein.)		Reinforced—1:2:4—must stand 2000 # at 28 days. Plain—1:2½:5	Basement (rein.) —12″ 20′ walls—8″ 1st 10′ of 30′ walls—10″	Cinders permitted in floor slabs, reinforced partitions 4″ thick and plain partitions 5″ thick
Philadelphia	16000	16000	650 300 for cinder concrete	500 Plain walls or large piers — 250		1:2:4— must stand 2000 # at 28 days	Reinforced—66% of that required for brick Block walls (1:2:3 mixture)—same as brick	Cinder concrete permitted in slabs and minor partitions—mixture 1:2:5; to stand 800 # at 28 days.
Portland, Oregon	16000	16000	650	400			Same as brick	Cinder concrete not mentioned
Rochester	20000	16000	650	650	450 with vertical rein. only	1:2:4 must stand 2000 # at 28 days	Block—basement 12″—1st, 2d and 3d stories—8″	Cinder concrete permitted for floor slabs and fireproofing
St. Louis	20000	14000	800	500		Reinforced — 1:2:4 must stand 2000 # at 28 days Plain—1:3:5	Same as brick	Hard burned clay aggregate—stresses 50% of those for stone concrete

*Crushing values of respective mixtures.
†For 1:2:4 concrete. ‡For 1:3:5 concrete.

Cities differ in detail of inspection and other parts of codes.

Hartford requires that a plant making block material must be in full operation when official tests are made and that the names of the owners of said plant must be placed on file with the Building Department. Block (1:3:4 mixture) must stand 1000# per sq. in. at 28 days. Allowable working load is 90# per sq. in. They require a license to make blocks and the license may be revoked for causes. The same license regulations hold at Portland, Ore., but block must be 1:3 (sand) or 1:3:5 (crushed rock and gravel) and must stand 2000# at 30 days.

Los Angeles requires the inspector to stop all work not within the requirements of the ordinances or be subjected to fine and imprisonment.

Minneapolis demands that designers of concrete buildings compute the dead and live loads and indicate same on drawing.

Philadelphia approves of reinforced concrete for all types of buildings whereby the design conforms to the requirements of good engineering practice.

For reinforced concrete New York demands that aggregate be screened crush stone or gravel, but aggregate for mass or plain concrete may be granite, trap rock or gravel.

Rochester, N. Y., demands that the Building Superintendent keep a detailed record of every operation, including the date of removal of forms, and file record with Building Department.

St. Louis makes no provision for block.

RETAINING WALLS.*

The evolution of the modern retaining wall has been a slow process to be measured only by centuries. Of retaining walls built by the ancients we have few records and I have even seen it stated that none of them has survived to our days. Now this fact, which is probably to a great extent true, I have explained to my own satisfaction by reasoning that any weakness in a wall, however infinitesimal, must, in the course of centuries, under the constant force acting against it, bring about its downfall.

But then I bethought me of what we had been taught in school about the Acropolis in Athens. As you know, the Acropolis is the sacred hill on which the Athenians built their temples and sanctuaries. In the second Persian invasion these buildings were destroyed, and when Pericles took up the work of rebuilding the temples on a scale of magnificence never surpassed, he at the same time enlarged the grounds on top of the hill by means of retaining walls. These walls stand today as they did 2,400 years ago and I thought it would be interesting to find out something about them. After considerable trouble, I did find out that the walls were founded on rock (this might have been expected), that they are built of splendid marble cut stone in regular courses, and that they are nearly as thick as high. Those old Greeks were a wise people, but we, who do not build for thousands of years, can profit little from this example. An engineer who would propose to build retaining walls on such lines would be promptly fired.

Now if we take a step forward of about 2,000 years, we get on more promising ground. The European nations were at that time—the end of the seventeenth century—indulging in one of their chronic world wars, all Europe combining against the ambition of a powerful monarch, Louis XIV, "the king of inflated memory," as Mark Twain calls him. One of the features of this war was the building of a chain of fortresses along the eastern and northeastern frontiers of France, and here one of the greatest engineers of all times found his opportunity. Every person of education, every high school pupil, is familiar with the names of Marlborough and Turenne, but how few people know about their great contemporary Vauban!

I may here remark that there is much complaining nowadays that our profession is not adequately appreciated. It's our own fault; instead of proclaiming the deeds of great engineers from the housetop, we let them sink into oblivion. And Vauban was not only a great engineer, but a great man. He dared to take the part of the starving, downtrodden peasantry of France against the tyranny of the ruling classes. With the fortifications which he built we are here only concerned in so far as a great part of the work consisted in retaining walls, and up to recent times Vauban's designs of these walls have remained standards. I recollect that in our university in Stuttgart we applied the latest theories of earth pressure to a number of Vauban's sections with satisfactory results.

Macauley has called Vauban the father of the art of building fortifications, and yet Vauban, perhaps fortunately for him, lived before the time when the resources of science were applied to such work. He had received the clerical education of a French nobleman of those days; school training in the engineering profession was then unknown. His genius was his guide.

But with the lapse of another century a new era opens; science steps in and under the leadership of Coulomb, one eminent French engineer after another applies his mind to a scientific solution of the problem of proportioning retaining walls; for the first time we hear of such terms as angle of repose, line of rupture, etc. Undoubtedly our profession is under great obligation to these men of learning who did their work towards the end of the eighteenth century.

And yet there is no finality to these investigations. The problem is carried over into the nineteenth century, where the battle of the savants is carried on in Germany under Weyrauch as leader, and, as England's share, Rankine's researches enrich the profession.

And the end it not yet. In the twentieth century the bloodless fight has crossed the Atlantic to our own country, where just now Professor Cain is holding the banner aloft.

There is no doubt we needed a theory, we needed a formula, and we have got them; we have got them by the score! Fortunately, experience has proved that no matter which one of the better known theories we use, we are on the side of safety, and there is, furthermore, little doubt that the theory worked out by Coulomb 130 years ago would answer today as well as Weyrauch's or Rankine's.

But there is one important point to be kept in mind, a point which is too little insisted on in most treatises—i. e., that in ninety cases out of a hundred the point of danger is not in the wall itself, but underneath the wall, in its bearing. As far as I know, no reasonably built wall has ever failed through misproportion of the wall, but through yielding of the foundations.

All theories of retaining walls have two assumptions in common. (1) That the line of rupture of the fill is a straight line. (2) That the pressure of the earth fill against the wall acts at one-third of its height. All we know about these assumptions is that they are not correct, the first because the line of rupture is anything but a straight line; the second, because an earth fill is not a fluid. The assumption may, however, be considered as approximately correct and as convenient working theories.

The greatest advance in the building of retaining walls is of very recent date. The old solid masonry wall is now finally discarded and we build instead concrete walls, either solid or articulated.

The average cross-sections of a masonry and of a concrete gravity wall have been aptly compared to a parallelogram and to a triangle respectively. This comparison alone marks the great advantage gained, inasmuch as, provided the cross-sectional area is the same, in a triangle the center of gravity is further from the face of the wall than in a parallelogram.

The formulas developed for the masonry wall have, as far as I know, not been modified to suit the concrete wall, and it has always struck me as a rather doubtful supposition, that in the best known of the formulas, the one by Rankine, the direction of the resultant of the earth pressures is independent of the slope of the back of the wall. And now we come to a startling proposition; the gravity wall is rather a clumsy, primitive affair, most any reasonable formula will fit it; but the skeleton (articulated) wall is a highly specialized structure. We have seen, or, at least, I have tried to make you see, that our theories of retaining walls are merely convenient approximations, and yet, based on these approximations, we have to go through all the elaborate figuring of the moments, shears, bond stresses, etc., for each one of the component parts of the skeleton walls. This is somewhat like carefully preparing plans for a building on a rather doubtful foundation.

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* Reprinted from the Journal of The Engineers' Club of St. Louis, Vol. V, No. 2. Paper delivered before the Associated Engineering Societies of St. Louis by Carl Gayler, consulting engineer.

The concrete wall is undoubtedly an advance over the masonry wall, but it has its drawbacks compared with the latter. The influence of changes of temperature is the same in either case, but with the masonry wall the effects are distributed over numerous horizontal and vertical joints and are not apparent to the eye; with the concrete wall they are concentrated, they produce cracks which are very much indeed apparent to the eye. And this is not all: Concrete in drying has the provoking property of contracting. A block of concrete during the process of drying and hardening will not only unrergo contraction, but also deformation as we can daily see on our sidewalks. To some extent the amount of this change of shape may be learned from textbooks, but what we know for certain is that it does take place and the more so the richer the concrete. There is, and I am speaking from personal experience, in all nature no more doleful sight to an engineer than one of these confounded shrinkage cracks in the face of a concrete wall; if only an eighth or a sixteenth of an inch wide, it glares at you like some fateful chasm.

The methods by which we try to prevent the formation of cracks are well known and I hardly need to describe them. Either expansion joints are built at proper distances or systems of skrinkage bars are inserted in the wall near its face, or a combination of both systems may be used. These methods have not been standardized yet and probably never will be, much leeway will always be left to the engineer.

In one respect the concrete retaining wall is at an advantage over other concrete structures; it cannot expand or contrast altogether freely, being held firmly all along its base. This may, to some extent, explain the case of retaining walls, holding not an earth fill, but a great volume of water, built and built successfully, in our city, in defiance of the points brought out above. I refer to the outer walls of the Compton Hill Reservoir. I will just select the one point which has puzzled me most. I mean the four corners where the walls, each hundreds of feet long, meet at right angles and are continuous and strongly bonded together. It is true the walls are low, they have an unusually wide base, they are heavily reinforced against horizontal expansion or compression, and no doubt the execution of the work was excellent, but, allowing for all that, there must be, considering the great length of the walls, some movement, some tendency either to push out or to tear apart the ends of the walls at each of the four corners of the reservoir. The tearing apart can be effectively prevented by steel reinforcement and this has been done, but how about the other movement? We have to remember that shrinkage bars are of limited use against elongation of the wall, inasmuch as the coefficient of expansion and contraction under temperature changes is practically the same for concrete and steel. But the work is perfect throughout; there isn't a crack in all the 2,600 feet of its length. This seems to be one of those cases where theory and practice come into collision and where nothing is left to the wise man but to say: "Well, so much the worse for the theory."

The problem of the retaining wall can hardly be said to admit of a scientific solution, either as to strength or as to details; unlike the truss it cannot be proportioned according to some convenient strain sheet, and this is precisely why it will always be an attractive subject to an engineer of independent judgment.

CARL GAYLER.

Book Reviews

OLD CROSSES AND LYCHGATES. By Aymer Vallance. London: B. T. Batsford, Ltd. New York: Charles Scribner's Sons. 7 x 9½ inches, 198 pages, 237 illustrations. Cloth. Price, $7.50.

The charm of beautiful illustrations at once makes this book appeal. As the illustrative example is the most important thing in preparing a book of this character great care has been exercised in obtaining the best photographic work and in the reproduction. The use of a sepia ink gives a fine depth to the reproduced photographs and is equally effective for the many drawings and rendered sketches.

Following an introductory chapter of historical reference but extensively illustrated there are seven chapters which cover the substance of the book. These deal with monolithic crosses, the shaft-on-steps type, spire-shaped or Eleanor crosses, preaching crosses, market crosses, unclassified varieties and lychgates.

The cross is not an American institution and examples in this country are confined to churchyards, used as memorials, but in England they are closely bound up with local history and tradition. They possess marked architectural interest, nevertheless, and are well worth study for their details, proportion and design.

The author's purpose in preparing the book was to present the appropriateness of these forms for use as memorials of the trials and glory of the Great War. The examples are all from England and Wales and every type found in those areas is illustrated in the book.

The chapter on lychgates presents many illustrations of these interesting entrances to church and graveyards. The construction in wood and stone varies in design with the locality.

(Continued on page 20 adv.)

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Book Reviews

(Continued from page 79 text)

HELLENIC ARCHITECTURE, ITS GENESIS AND GROWTH. By Edward Bell. London: G. Bell and Sons, Ltd New York: The Macmillan Company. 5 x 8 inches, 186 pages, illustrated. Cloth. Price, $3.00.

The author has considered in this work a subject which those familiar with architectural history will recognize at once as one which has received very scant treatment in most of the standard text books on the subject. Ferguson in his History of Architecture groped at the beginning of styles and forms basing his remarks more on theoretical deductions than on the results of research. Many other authors since his time have authoritatively traced the styles and given us works of great value, but little attempt has been made to show the aesthetic evolution of style in historical and logical sequence. To quote the author "To some extent this has been inevitable, because it is only within recent years that archaeological research has disclosed the remains of earlier phases of civilization in which the roots of classical culture were embedded, and the fact that much of this information is still to be sought in reports of private societies, or in special volumes which are not yet published in this country."

There is a fascination in delving into the beginnings of things which has no doubt spurred the author on and the same impetus intrigues the reader.

SHOP PRACTICE FOR HOME MECHANICS. By R. F. Yates. New York: The Norman W. Henley Company. 5½ x 8½ inches, 320 pages, 309 illustrations. Cloth. Price, $3.00.

The amateur workman, be he handyman about the house or farm or experimenter, must necessarily have a knowledge of the use of tools to practically apply them. Some men have a natural instinct for the use of tools and not infrequently the individual may have had actual instruction in their use in industrial classes in schools. Nevertheless the knowledge of the average man as to the use of tools is very limited. Few men except those trained in the trades have any knowledge of tools beyond ordinary hand tools of the carpenter. The purpose of this book is to instruct in the use of mechanical tools especially those of the machine shop working in metal. The amateur cannot usually profit by the assistance of other workmen and must work out many problems for himself. To assist such a worker this book is written. The book is systematically arranged first dealing with elementary mechanics giving fundamental knowledge of use necessary to every workman. Next the hand tools are considered, followed by measuring instruments and processes. The drill press and reaming are fully covered together with three chapters on the lathe work. Other chapters cover: grinding, pattern making, hardening and tempering steel, soldering and brazing, construction of a small power-driven press and a small grinding head, and general information on reading drawings.

(Continued on page 22)

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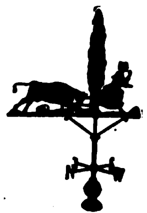

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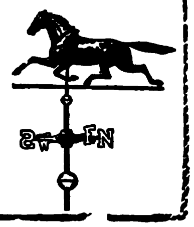

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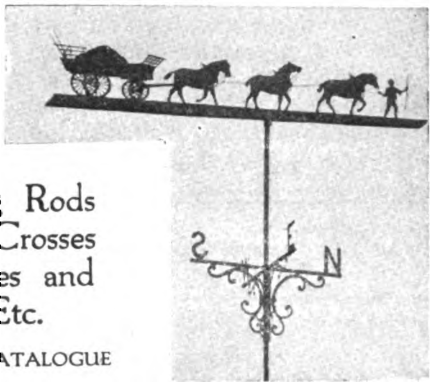

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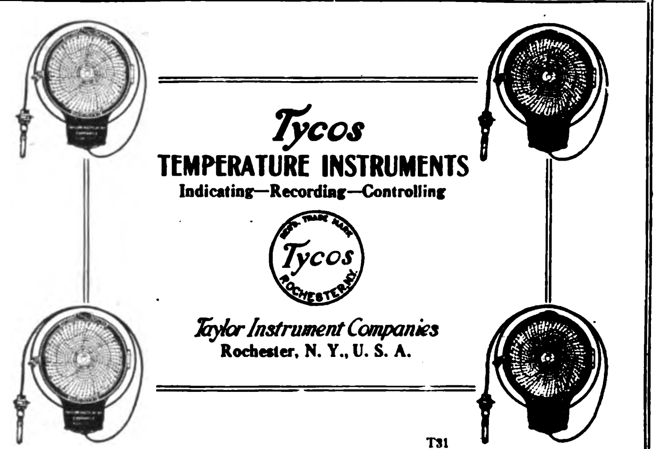

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(Continued from page 20)

A GLOSSARY OF THE MINING AND MINERAL INDUSTRY. Compiled by A. H. Fay, 1920. 753 pages. The Department of Interior Bureau of Mines has issued this publication as Bulletin No. 95, and the same may be obtained on application from the superintendent of documents. Bound in cloth. Price, 75 cents.

This paper contains more than 20,000 terms and nearly 30,000 definitions, covering technical and local usage in mining and metallurgy; it includes terms used at coal mines and coke ovens, oil and gas wells, metal mines and metallurgical works and quarries, as well as geological and mineralogical terms, and more than 2,000 Latin-American mining terms. Many obsolete terms are defined.

Current Notes

AMERICAN PAPER NOW USED ENTIRELY BY TELEPHONE MANUFACTURERS

The newspaper trade is not the only industry which is being affected by the shortage of paper. Few users of the telephone realize that one of the big elements in the makeup of the underground cable, the magneto and several of the other important adjuncts to the lines of communication is paper. In fact, it is the big factor for insulating purposes. Several layers of it are used beneath the leaden sheath the average human sees when telephone cables are being laid in the streets of his vicinity. The shortage condition of the grade of paper which has always been used has become so acute that several experts of the Western Electric Company are devoting all their efforts to developing some type of substitute.

Manila pulp paper has always been the big favorite among telephone cable manufacturers. Recently wood pulp has been used because of the shortage of the former, but it still lacks several of the finer qualities of the imported grades. Elasticity and a non-porus condition are absolutely necessary.

Prior to the war large quantities of all-linen paper made in Europe were used in certain processes in making condensers. None of the American manufacturers cared to handle it as it required so much attention and had such a limited distribution. However, three companies have now taken over the task in this country, and although cotton is used to a large extent their output is every bit as good as that of their foreign competitors.

VISUALIZING CITIZENSHIP (MOTION PICTURES FROM A CIVIC STANDPOINT).

The Municipal Reference Library, 512 Municipal Building, New York City, has issued a booklet with this title in which appear lists of titles of motion picture films on different subjects of interest to those concerned with civic affairs. Films on City Planning, Housing, Conservation, Community Developing, Education, Fire Prevention, Parks and Recreation, Safety and First Aid, etc., are given. Readers desiring copies should send *fifteen cents* to the Library asking for special report No. 4.

September

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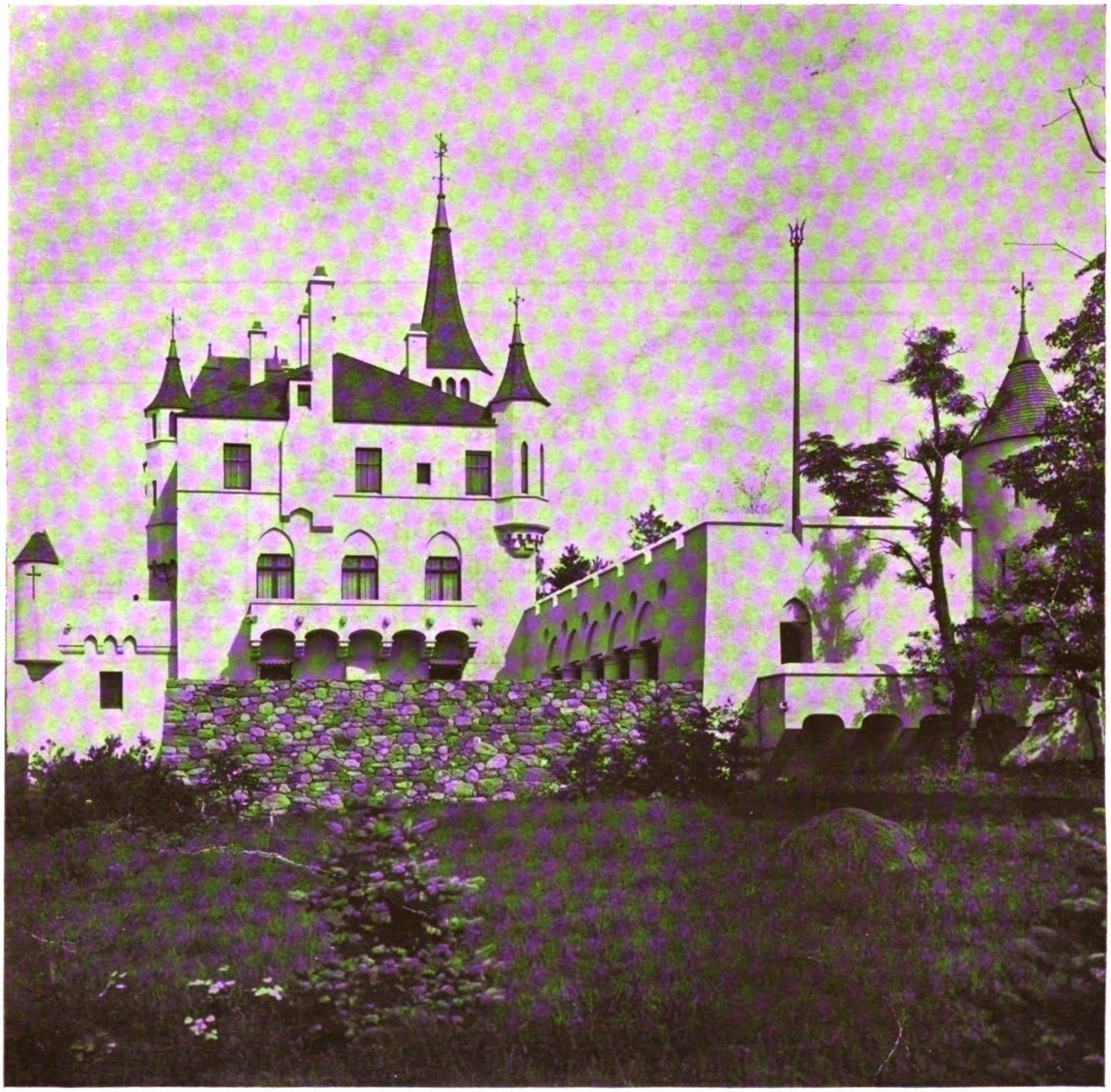

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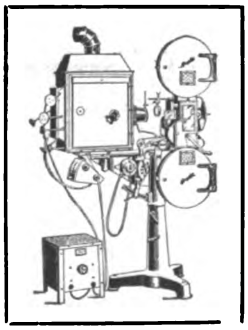

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Hunt & Hunt, Architects.

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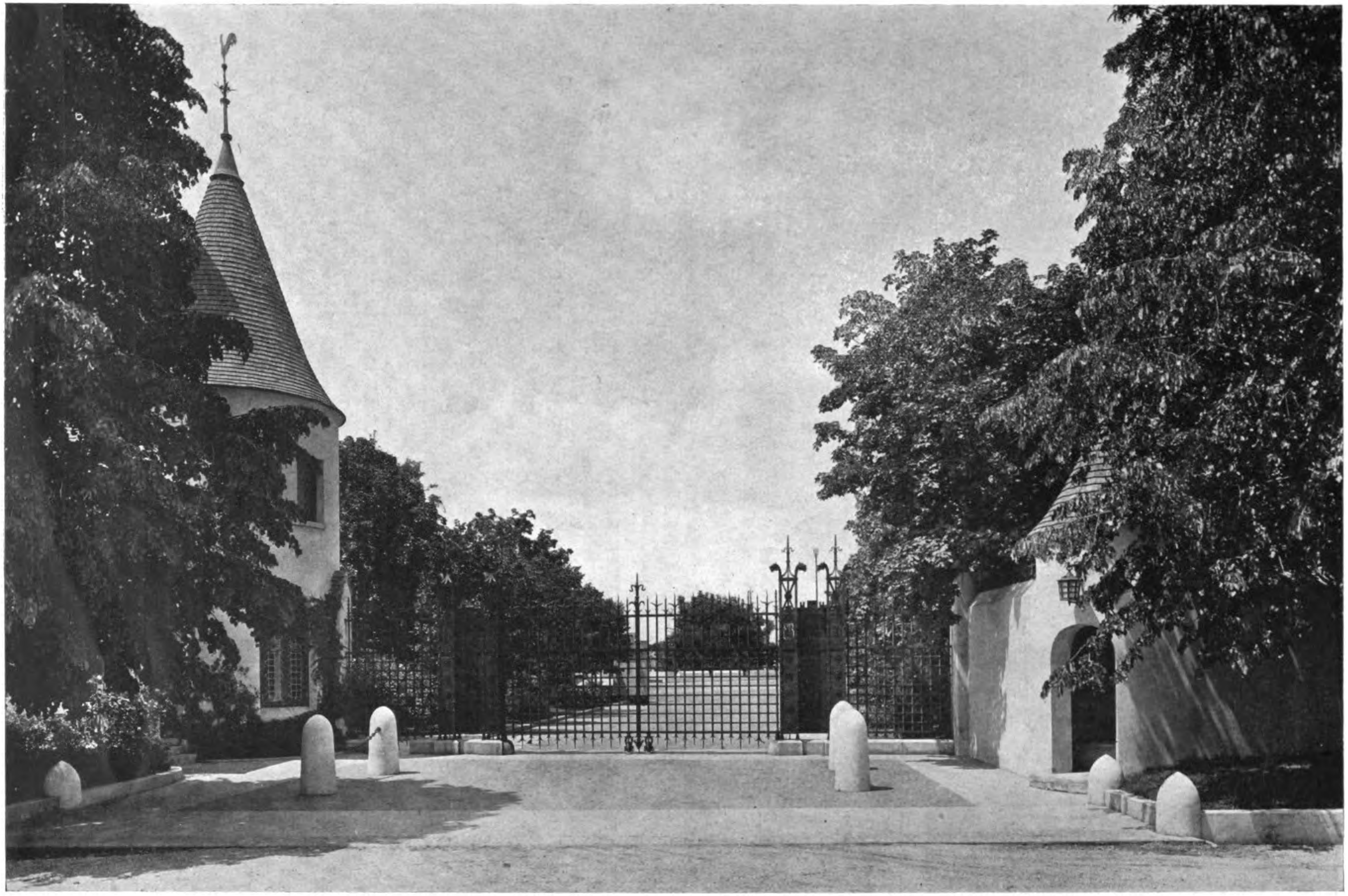

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ARCHITECTURE AND BUILDING

A Magazine Devoted to Contemporary Architectural Construction

WILLIAM P. COMSTOCK
Managing Editor

Volume LII SEPTEMBER, 1920 Number 9

GARMENT CENTER BUILDINGS.

A movement which originated with the Save New York Committee, primarily to get the large number of garment operatives off Fifth Avenue culminated in the formation of the Garment Center Realty Co., Inc., to build two of the largest loft buildings ever proposed for New York City. Occupation of and the congestion of the sidewalks on Fifth Avenue by the great crowds of workers in the clothing trades was beginning to be a serious menace to retail trade. A similar condition ruined the 23rd Street shopping district and forced the retail stores from that section to the Fifth Avenue, 34th and 42nd Street districts but still the manufacturers of garments desiring to be as near their trade as possible followed along and filled the loft structures on the side streets to a point where the crowding was excessive. Measures were necessary to relieve this situation for the benefit of parties interested and with the cooperation of the Fifth Avenue Association, the department stores, and the Merchant's Association, the movement to form another garment center was started by thirty-eight large manufacturers of women's garments who determined to erect their own buildings and run them on a co-operative plan. This was the origin of the Garment Center Realty Co., Inc.

The site selected was on the west side of Seventh Avenue, consisting of two block fronts from 36th to 38th Streets with the Hotel York and Hotel Navarre occupying the two remote corners. The buildings as planned will be built around these hotels and the backs of them will run through from street to street. The buildings are especially designed to meet the requirements of the garment trade and the architect in co-operation with the Board of the Garment Center Realty Co., Inc., studied the conditions of the trade both from the standpoint of the operator and from that of the manufacturer and has consolidated and co-ordinated the best ideas which have been developed by various manufacturers with the purpose of making these buildings as nearly ideal for the manufacturing conditions as possible.

The building, which extends from 36th to 37th Street, known as the South Building, is the larger of the two and contains some special features. In general, a description of it will fit the North Building as the general principles of construction are the same. The area of the south site is 40,000 square feet and of the north site 38,300 square feet and the total calculated floor area of the two buildings is 1,500,000 square feet. In the south building, there is a basement and 22 stories in the main section above the street with a partial 23rd story and a 24th story in the form of a pent house. The ground floor will be used for stores. All stories above are for loft purposes inclusive of the 22nd. The 23rd story will be used for the employers' club; kitchens will occupy the 24th story pent houses with tank pent houses above. As mentioned before, the Hotel York occupies the corner of the block on 36th Street and Seventh Avenue and the South Building is built around it.

In compliance with the New York zoning laws there are what is known as "set backs." The 25% area limit for manufacturing runs 100 feet west of the westerly lot line of Seventh Avenue, beyond this it is permissible to use the entire area for manufacturing. Facing Seventh Avenue which is 100 feet wide the building rises fifteen stories before the first set back. The zoning law permits the height based upon the avenue frontage to extend back on the side street 150 feet. From the 16th story to the top the set back is one column bay. Upon the side streets where the width of the street is 60 feet and back of the 150 foot point west of Seventh Avenue the full manufacturing zone is entered and the set back occurs at twice the width of the street, thus the building is set back one column bay at the 10th story and two column bays at the 17th story. At the 23rd story, there is a further set back of three feet.

The plan provides for public entrances to offices and showrooms on Seventh Avenue and on 36th Street and an arcade connects these two entrances, running behind the Hotel York. There are five passenger elevators at the 7th Avenue entrance and four at the 36th Street entrance. The vestibules and entrance halls have Bottocino and Black and Gold marble wainscoting and the floors are to be of Tracon stone, Black and Gold and Belgian marble. The freight elevators, ten in number, are grouped in the centre of the darkest portion of the building and these provide for the receiving of all shipments and for the transportation of the employees. Special entrances are provided to reach these freight elevators at both 36th and 37th Streets, at the far westerly end of the building. Driveway ramps run from the streets to shipping platforms at the basement level, thus all trucking goes directly into the building and all freight handling is done within the building area and off the sidewalk. At a level slightly above the ground floor and over the shipping platform level there is an elevator approach of ample proportion from which all employees in the building enter the elevators. Ramps opening out at the freight driveway entrances lead to the elevator foyer from both side streets. The general toilet rooms are also located in the centre of the building. The battery of freight elevators and the toilet rooms form a division between the two sides of the structure so that there are two divisions of each floor, one facing 36th Street and the other Seventh Avenue and 37th Street. These two sections of a story may be connected so that one firm may occupy the entire story. Each division is provided with double bladed spiral chutes so that all small package shipments can be sent directly from the loft to a general shipping room in the basement where the volume of the business will be sufficient so that an express company's representative will be on hand at all times. Similar chutes for rubbish are also included in the plans, which will take such matter to a receiving room in the basement for baling. The heavy freight handling facilities are excellent in that one of the great nuisances of a city manufacturing district is eliminated. No cases or boxes will be allowed to stand on the sidewalks as sufficient area is provided in the building at the shipping platform to take care of the entire shipping and receiving. The ramps leading to the shipping room will be so regulated that trucks will enter at the 36th Street side, and thence pass through the building and go out into 37th Street and if there are deliveries or calls to be made in the North Building, they can immediately cross the street, pass through that building and go out into 38th Street.

There are three stairways of the usual type and in addition a fire tower located at the end of the freight elevators in the rear court, being what is known as "scissors type" serving both floor divisions. An automatic sprinkler system is provided throughout the buildings, each building forming a separate unit. The buildings are of steel frame construction, using over 14,000 tons of steel with cinder concrete and wire mesh short span floor system, cement floor surfaces and slag and tile roof. The windows are provided with double hung sash in hollow steel frames. The exterior treatment consists of pier bases and sill of Deer Island granite, three stories of selected gray Indiana limestone with the remainder of grey face brick laid with raked joints, a terra cotta cornice and limestone band courses.

The 23rd story of the South Building provides space for an employers' club which will have a gymnasium with shower and locker rooms, lounge rooms, dining room, reading room, etc. The kitchen for this club will be located in the pent houses in the 24th story. The North Building is seventeen stories high but in other respects is similar to the South Building, except that its plan is reversed.

The buildings will be run by a trusteeship in which each owner or tenant participates as a member of the company. The rentals are to be based on the operating expenses with allowances for depreciation and stock owners in the company will find in the buildings a permanent future home, unaffected by mounting rentals. The company is running its own offices for the construction of the buildings and all sub-contracts are let direct through the construction division of the company.

The structural steel was designed by Isaac Menline, structural engineer and the mechanical engineering by the Richard D. Kimball Co.

The heating will be from a central plant located in the sub-basement of the North Building where four 300 H. P. Heinie water tube boilers will be installed, fed by automatic Detroit stokers, coal being fed to the stokers from chutes and hoppers by motor driven bucket conveyors which hoist the coal from the coal bunkers under the sidewalk which have a capacity of 800 tons of coal.

The ashes will be exhausted by air and delivered to a large receiving tank of reinforced concrete, located over the driveway ramp, thus eliminating ash cans and dust on the sidewalk and also providing a clean boiler room floor.

A concrete conduit across and under the roadway in 37th Street will be built to contain the necessary pipe connections to the South Building. There will be installed an auxiliary boiler plant in the South Building consisting of four 200 H. P. Oil City return tubular boilers which may be used during the early fall or late spring. Electricity will be provided by Edison service. There are separate house pumps and fire service in each building.

The cost of the construction of the two buildings is estimated at $10,000,000 and with the land the investment will be about $15,000,000.

Walter M. Mason.

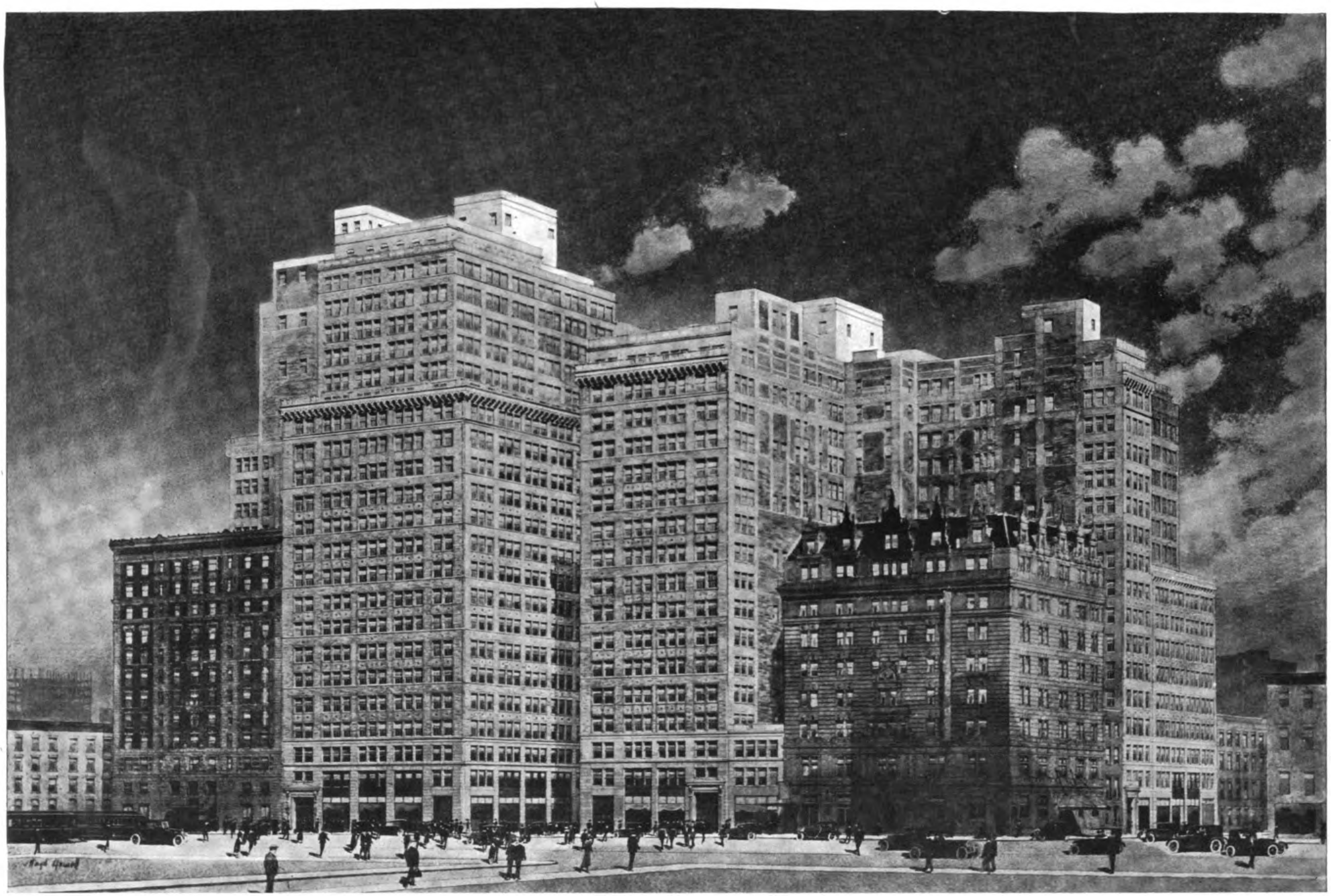
The demolishing and excavating in connection with these buildings was done by Purcell & Gilfeather Corporation, and the foundation work was done by the Pierce Foundation Corporation. Nearly two million face bricks will be used on these buildings and will be supplied by Fredenburg & Lounsbury. The concrete mixers used are made by Koehring Machine Company. Federal Terra Cotta Company have the contract for the terra cotta work; M. H. Rothschild, Inc., are the mason contractors and Grassi Contracting Co., Inc., have the contract for the plastering. The builders' materials will be supplied by the Krider Building Material Co., Inc. Ettinger Contracting Co., Inc., are doing the fireproof arch work. W. G. Cornell Company have the contract for the plumbing and electrical installations and E. G. Woolfolk & Company are the heating contractors. S. H. Pomeroy Company, Inc., have the contract for 4,800 hollow metal windows used on the exterior and in the courts. The ornamental iron work and stair cases will be executed by Harris H. Uris Iron Works. A. R. Zicha Marble Company have the contract for the interior marble work. James Gillies & Sons, Inc., are the mason contractors. The scuppers were supplied by Windshield Scupper Co., and the sash pulleys by Samuel Kahn. The roofing and sheet metal work was done by Benjamin Riesner, Inc.

BELMONT RESIDENCE AT SANDS POINT, L. I.

A trip on Long Island well repays the student who would investigate the work of our best designers of residence architecture. From small houses to great estates the whole gamut is run and as in sizes so in styles there is extended choice. Hunt and Hunt have recently contributed to the architectural embellishments of Long Island with their novelly conceived design for the residence of Mrs. O. H. P. Belmont at Sands Point known as "Beacon Towers." Their prototypes are not difficult to seek in early chateau and medieval keep. The gate lodge presents a charming approach from the road and the pinacled roofs mark the residence on the skyline as viewed from the Sound.

The walls of white cement are capped by roofs of red green-streaked tile in effect as if lichen covered. The grounds are informally planted which together with the rubble stone walls softens the setting of the house.

The first story contains a great hall, approached from the plaza before the house, the great dining room, twenty by forty feet, reception room and serving rooms. There are also in this story two master bedrooms with baths and all of the bedrooms

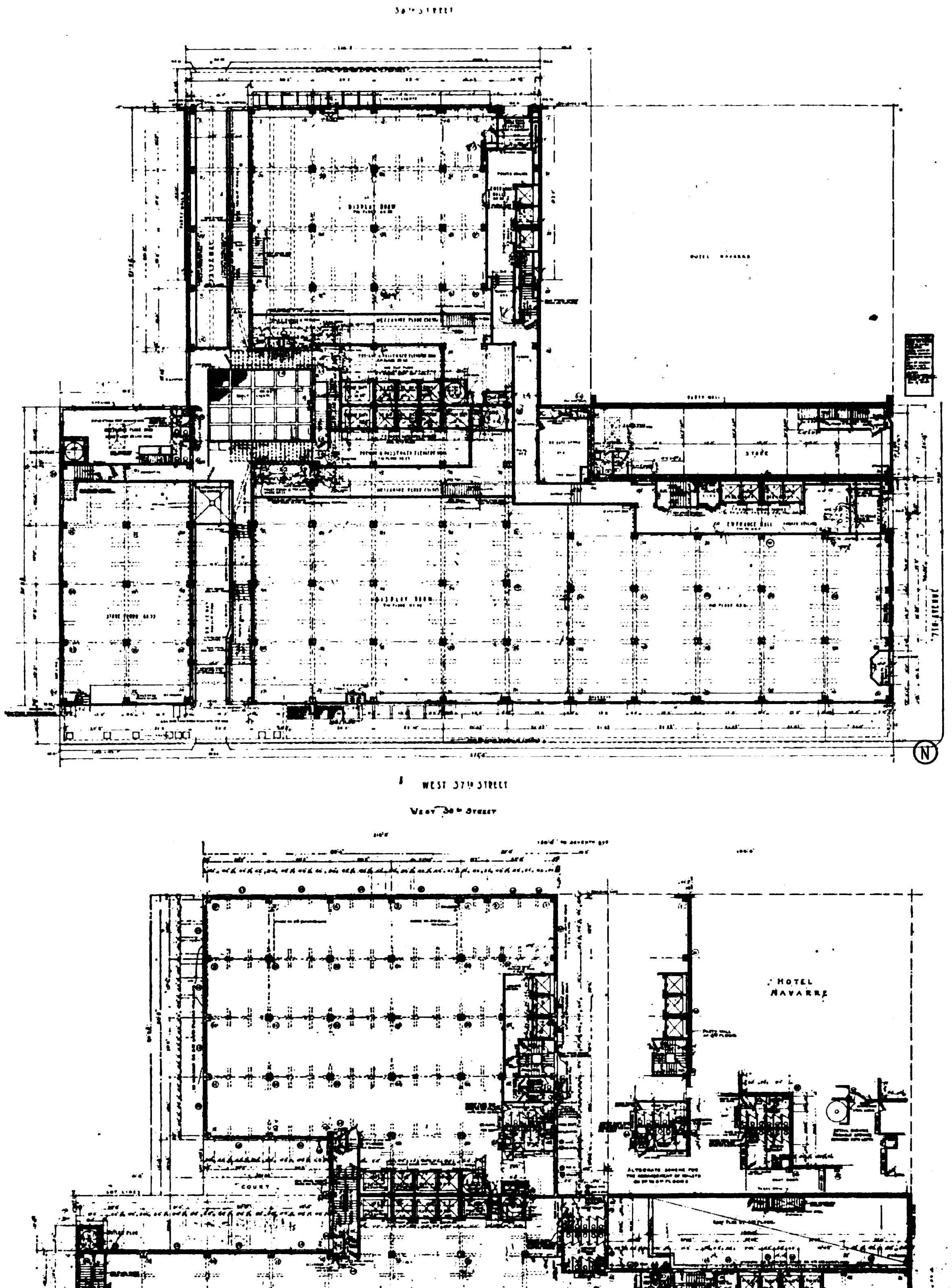


ARCHITECTURE AND BUILDING. Plate 101.

GARMENT CENTER REALTY BUILDINGS, SEVENTH AVENUE, 36th to 38th STREETS, NEW YORK CITY.

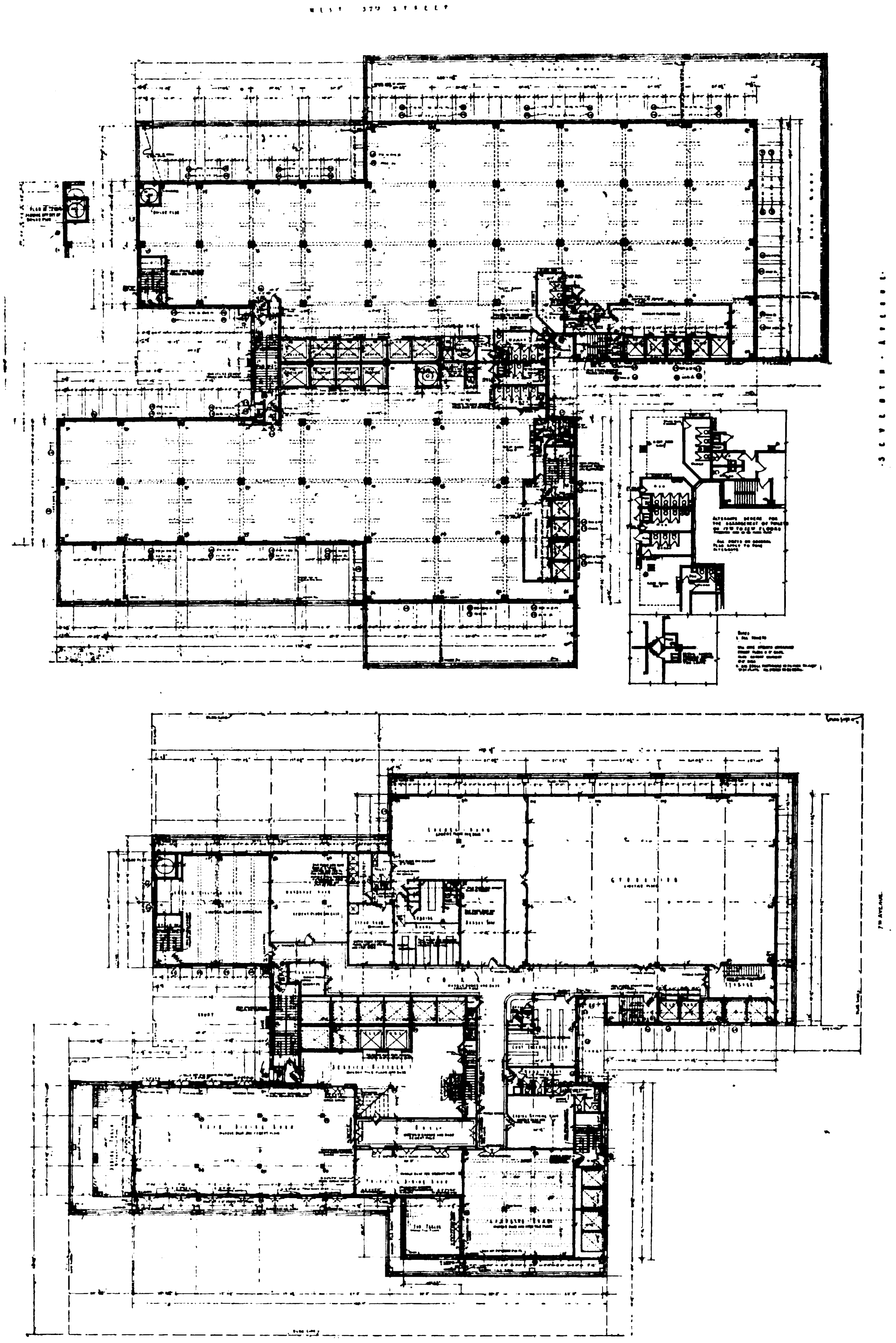
Walter M. Mason, Architect.

Plumbing and electrical contractors—W. G. Cornell Co.; heating contractors—E. G. Woolfolk & Co.; **fireproof** arches—Ettinger Contracting Co., Inc.; **face brick**—Fredenburg & Lounsbury; builders' materials—Krider Building Material Co., Inc.; **plastering—Grassi Contracting** Co., Inc.; mason **contractors—M.** H. Rothschild, Inc.; terra cotta work—Federal Terra Cotta Co.; concrete mixers—Koehring Machine Co.; foundation work—Pierce Foundation Corp.; **demolishing and excavating**—Purcell & Gilfeather Corporation; interior marble—A. R. Zicha Marble Co.; ornamental iron and stair cases—Harris H. Uris Iron Works; hollow metal windows—S. H. Pomeroy Company, Inc.; cut stone contractors—James Gillies & Sons, Inc.; roofing and sheet metal work—Benjamin Riesner, Inc.; scuppers—Windshield Scupper Co.; sash pulleys—Samuel Kahn; chantrell hardware furnished by G. Goldberg & Sons, Inc.



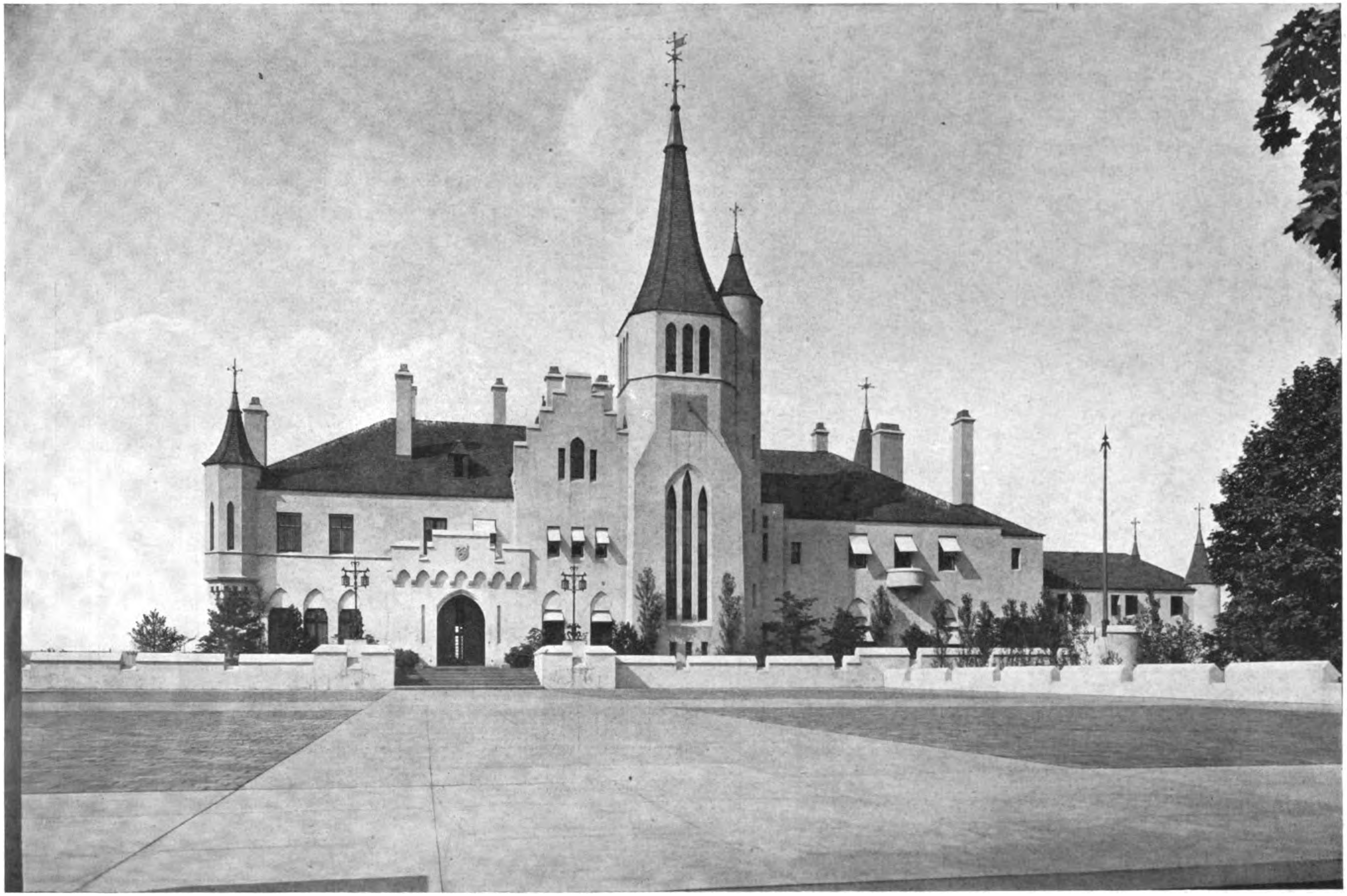
1st FLOOR PLAN—ABOVE; 3d TO 9th FLOOR PLAN—BELOW, GARMENT CENTER REALTY BUILDINGS, SEVENTH AVENUE, 37th AND 38th STREETS, NEW YORK CITY.

Walter M. Mason, Architect.



17th TO 22d FLOOR PLAN—ABOVE; 23d FLOOR, MAIN ROOF PLAN—BELOW, GARMENT CENTER REALTY BUILDINGS, SEVENTH AVENUE, 36th AND 37th STREETS, NEW YORK CITY.

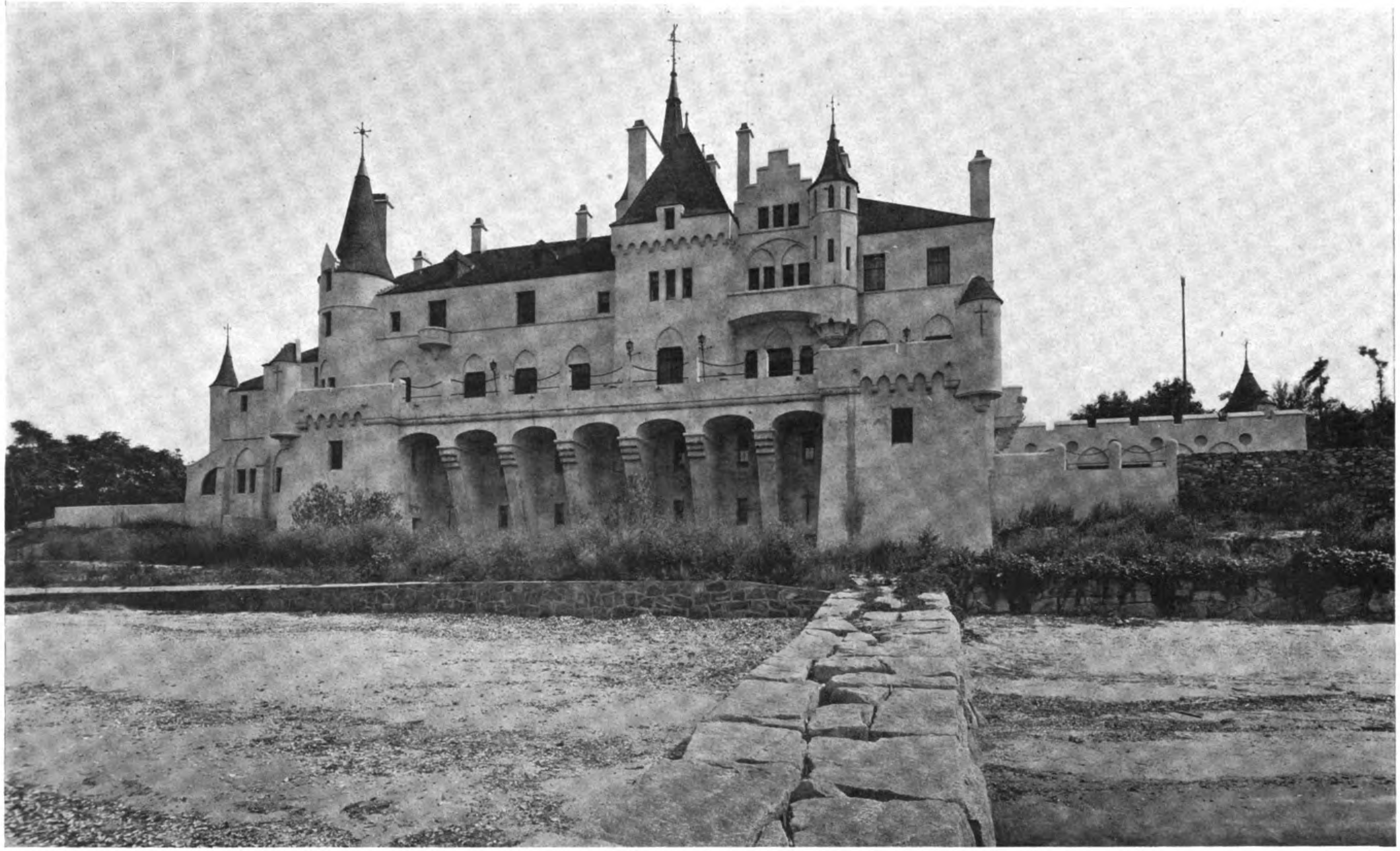
Walter M. Mason, Architect.



ARCHITECTURE AND BUILDING. Plate 104.
Built by Cauldwell-Wingate Co.; asphalt blocks—The Hastings Pavement Co.; cement walks and floors—Harrison & Meyer; glass—Joseph Elias & Co.

"BEACON TOWERS," RESIDENCE OF MRS. O. H. P. BELMONT, SANDS POINT, L. I

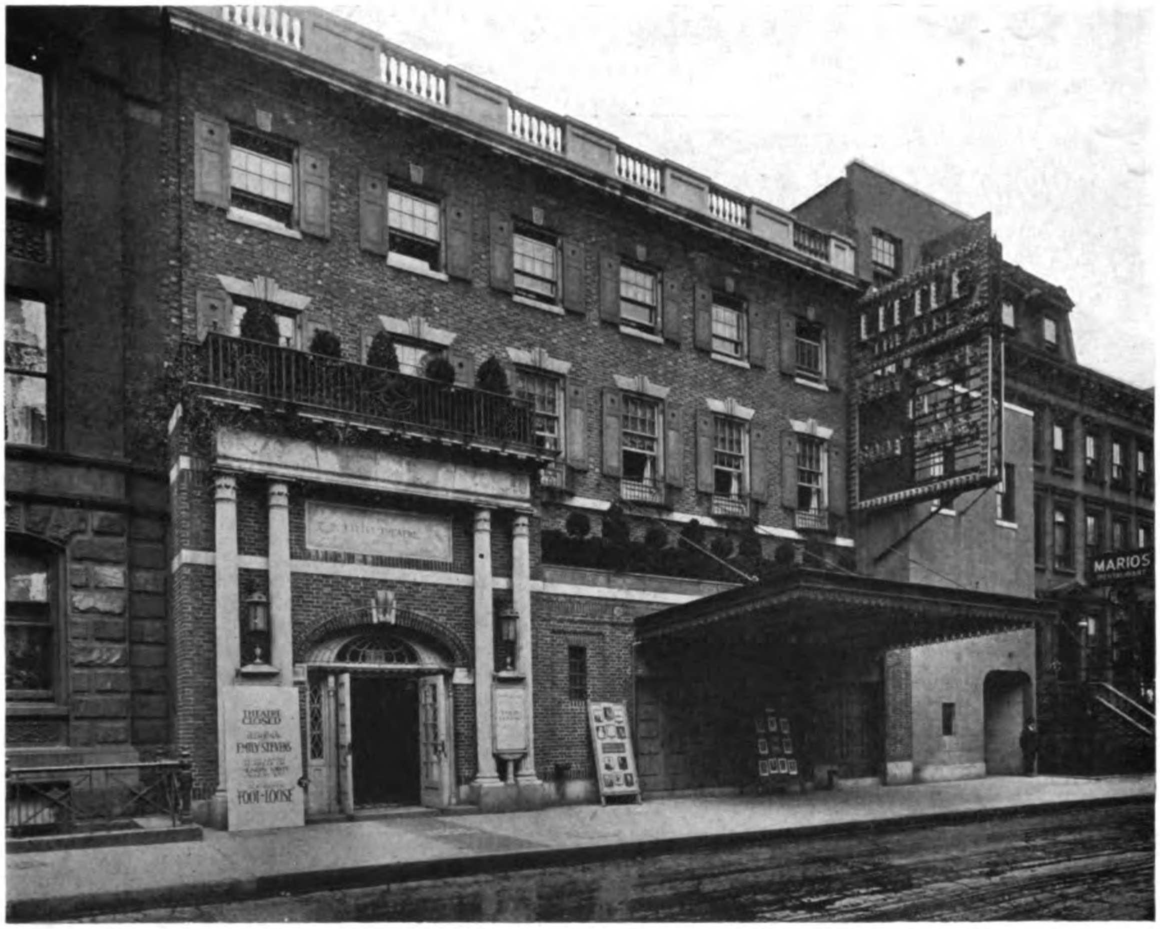
Hunt & Hunt, Architects.



ARCHITECTURE AND BUILDING. Plate 105.
Built by Cauldwell-Wingate Co.; plumbing—J. N. Knight & Son; gates and fences—Sexauer & Lemke.

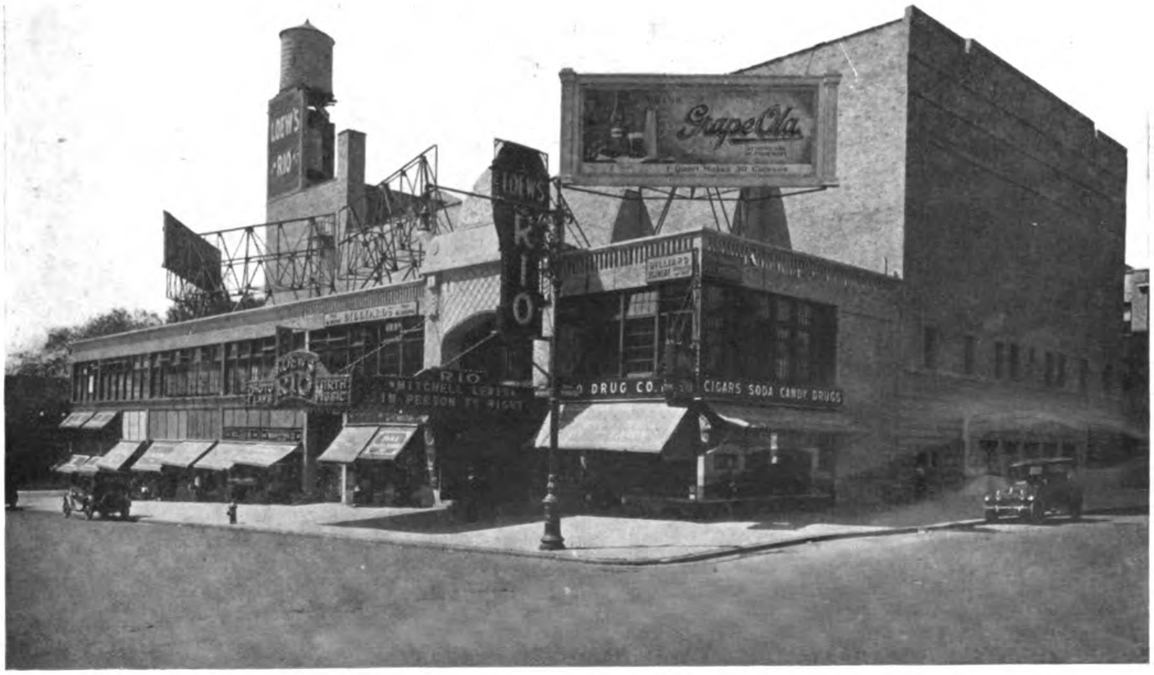
"BEACON TOWERS," RESIDENCE OF MRS. O. H. P. BELMONT, SANDS POINT, L. I.

Hunt & Hunt, Architects.



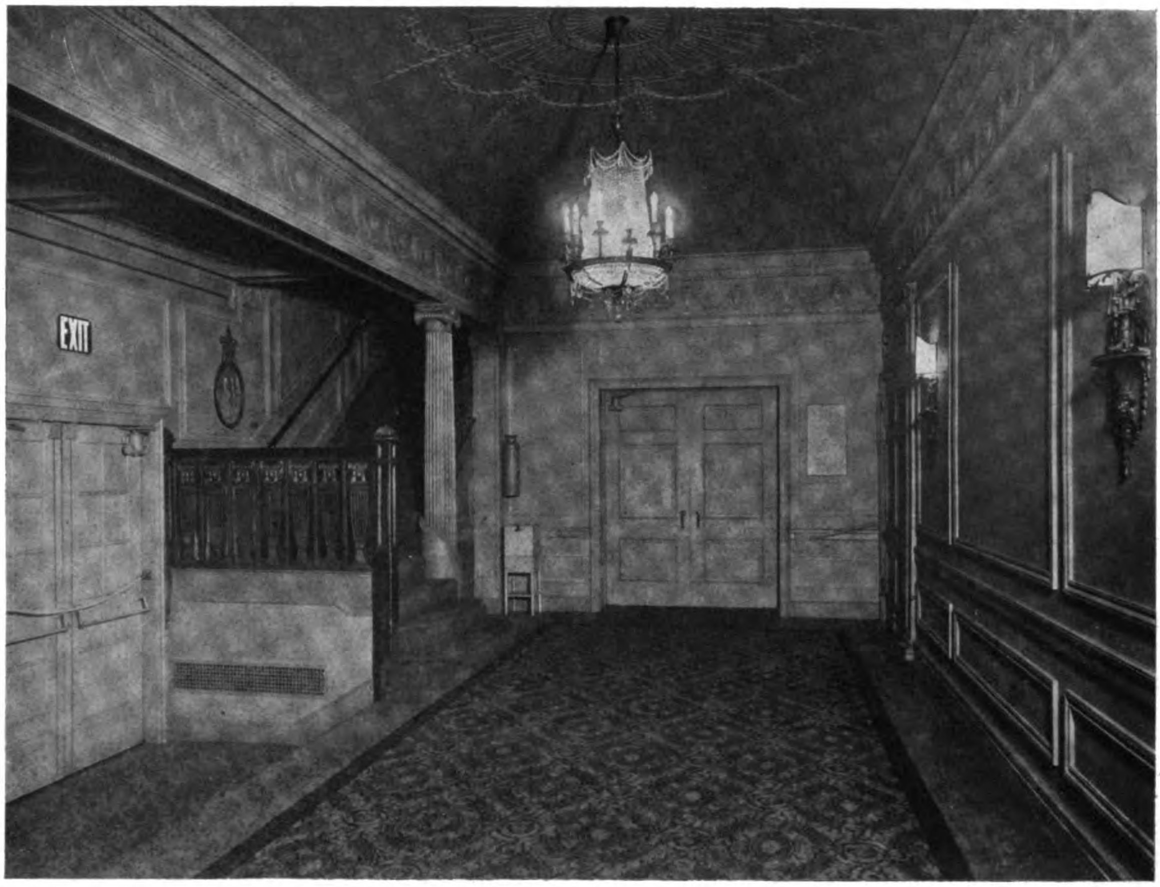
LITTLE THEATRE, WEST 44th STREET, NEW YORK CITY.
Herbert J. Krapp, Architect.

Built by Fountain & Choate; electrical contractors—Edwards Electrical Construction Co.; skylights—Superior Skylight Co.; steel construction—The George A. Just Co.

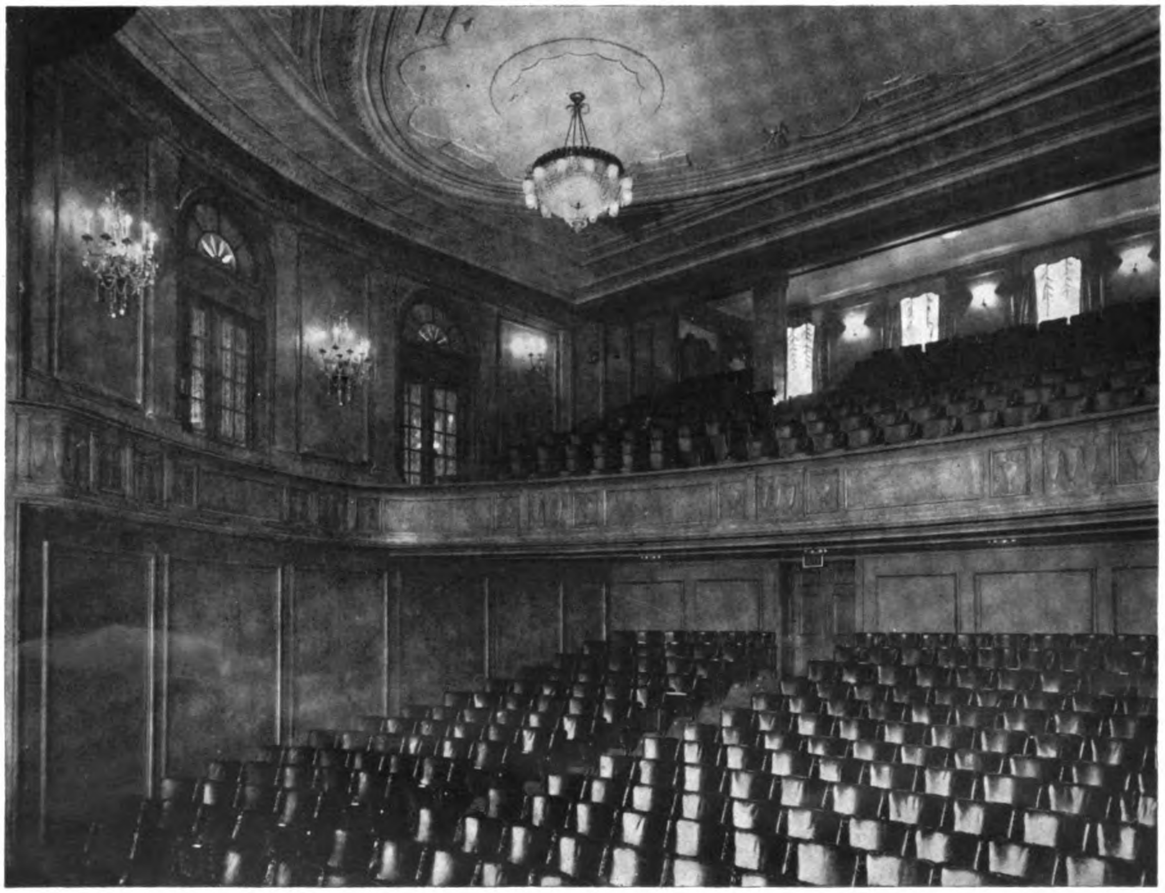


RIO THEATRE, 160TH STREET, NEW YORK CITY.
Herbert J. Krapp, Architect.

Electrical contractors—Edwards Electrical Construction Co.; skylights—Superior Skylight Co.; steel construction—The George A. Just Co.; ornamental iron work—A. Perlman Iron Works; sprinkler system—The United States Automatic Sprinkler Company.

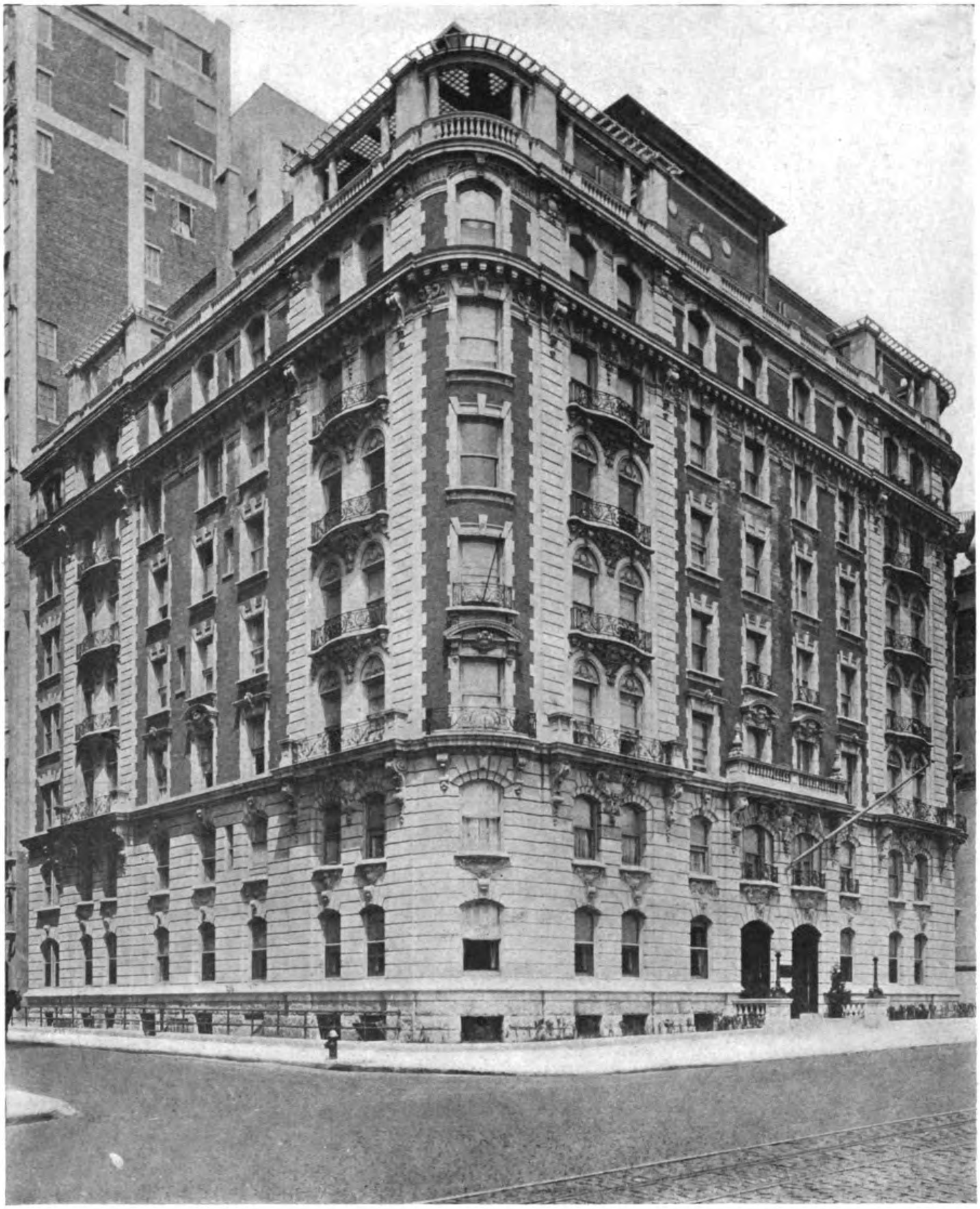


LOBBY, LITTLE THEATRE.



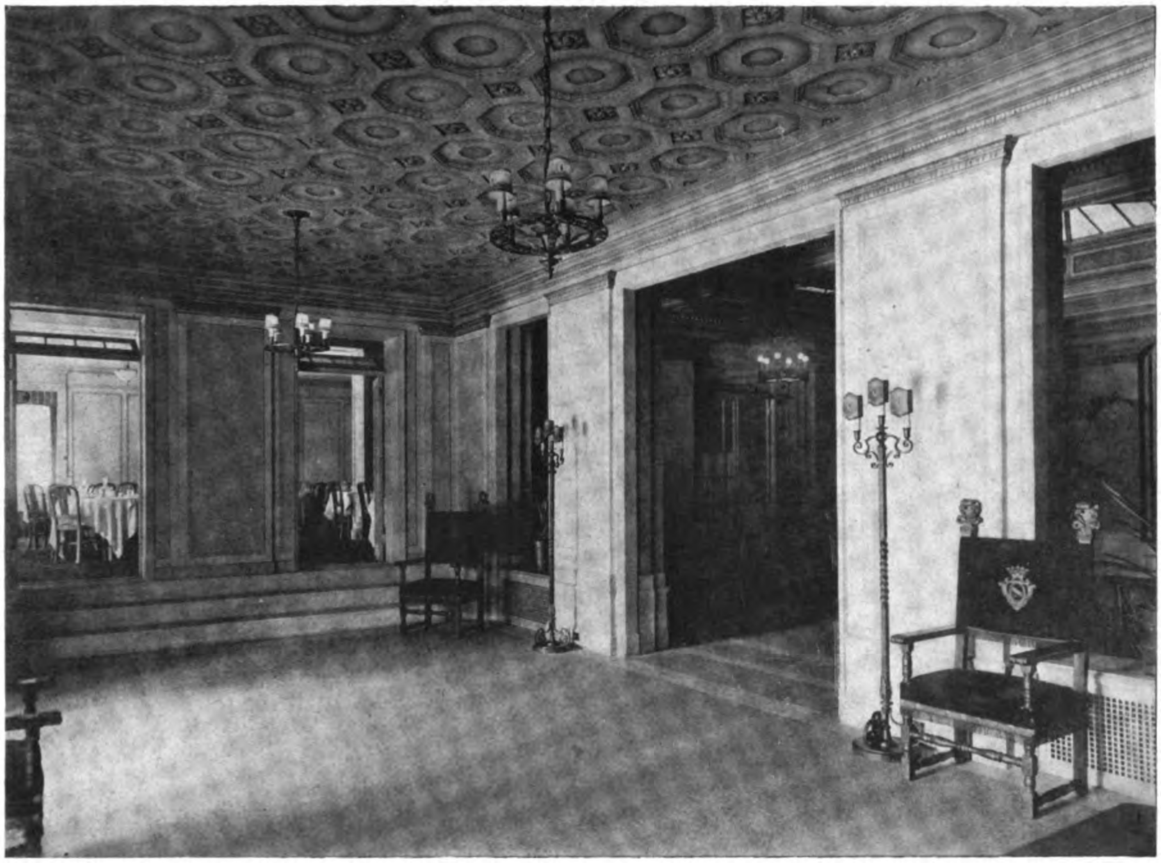
AUDITORIUM, LITTLE THEATRE, WEST 44th STREET, NEW YORK CITY.
Herbert J. Krapp, Architect.
M. J. Levy, Illuminating Engineer.

Built by Fountain & Choate; decorators—Unitt & Wickes.

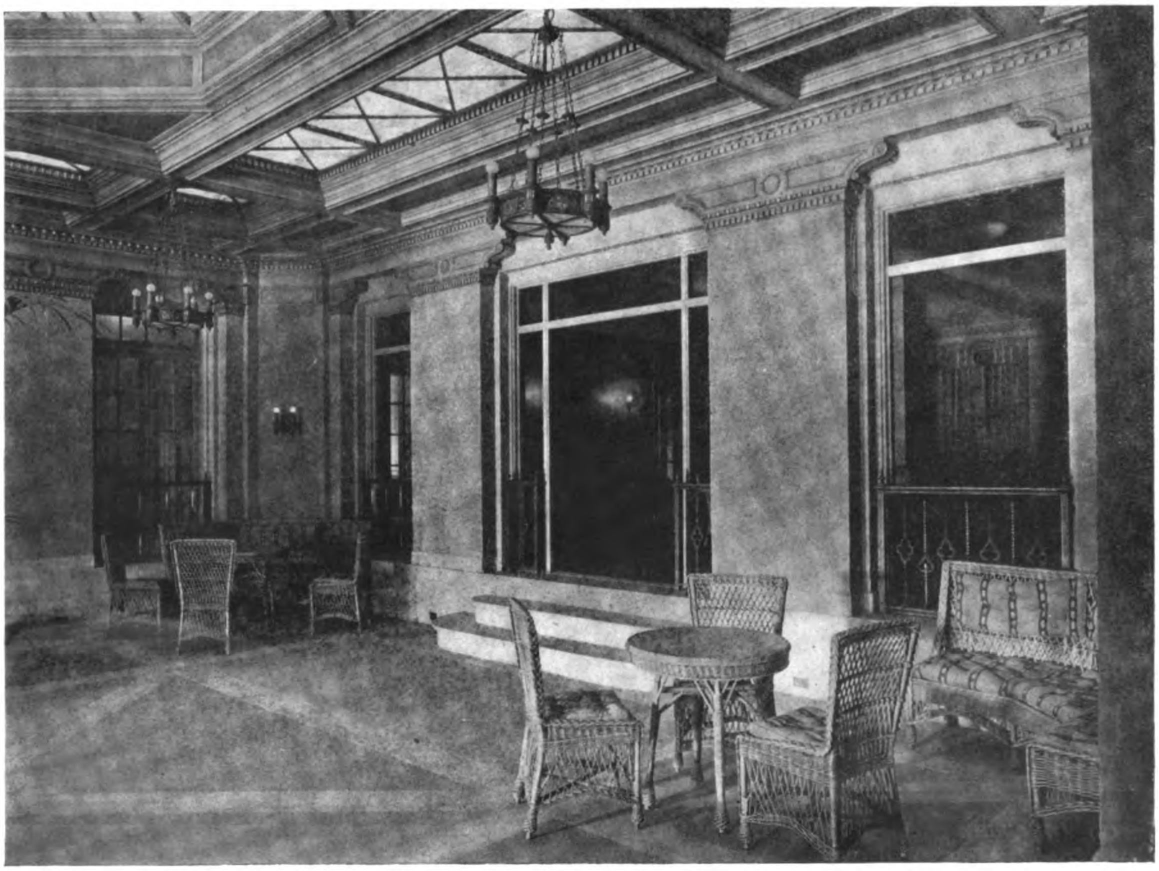


TOWN HOUSE CLUB, 71 CENTRAL PARK WEST, NEW YORK CITY.
Starrett & Van Vleck, Architects.

Architecture and Building. Plate 108.
Built by Fred T. Ley & Co., Inc.; elevators—Watson Elevator Co.; elevator door equipment—Richards-Wilcox Manufacturing Co.

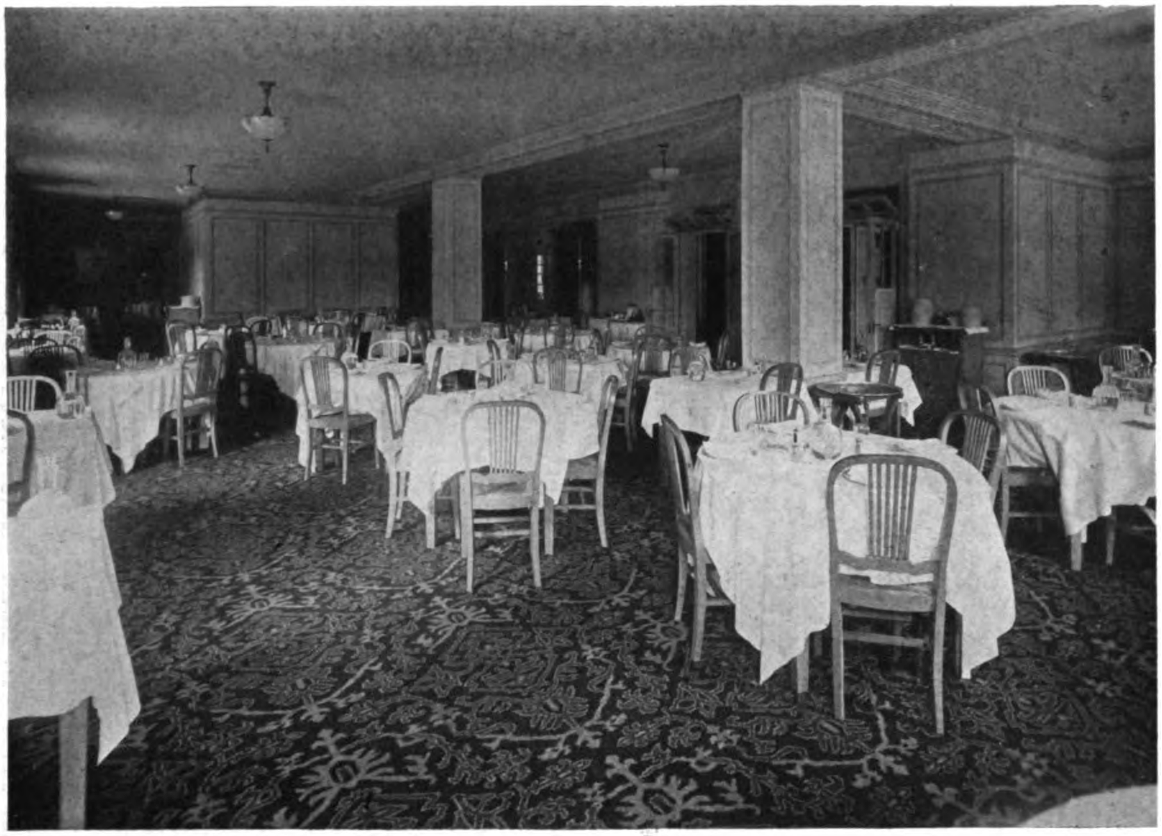


Lobby furniture—A. Pancani. A PORTION OF LOBBY, TOWN HOUSE CLUB.

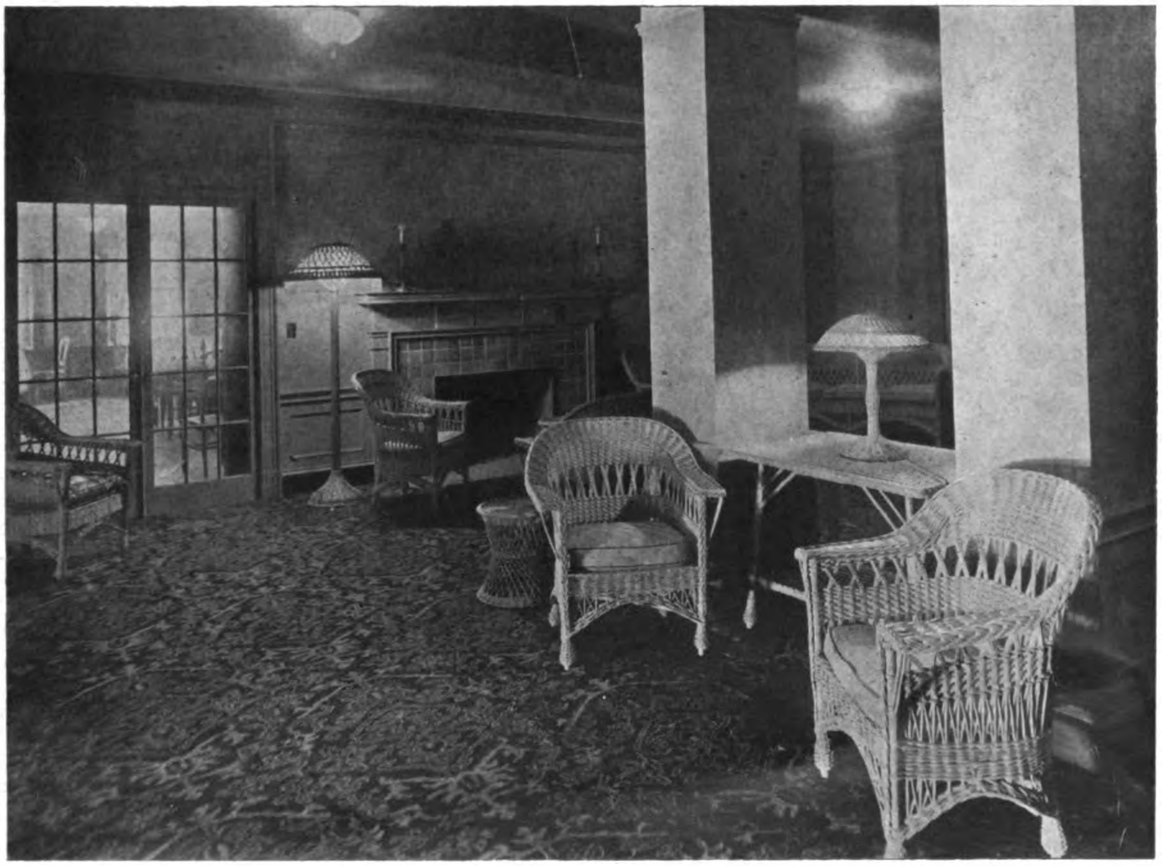


PATIO, TOWN HOUSE CLUB, 71 CENTRAL PARK WEST, NEW YORK CITY.
Starrett & Van Vleck, Architects.

Built by Fred T. Ley & Co., Inc.; painting and decorating—The Barker Painting Co.; willow furniture—Minnet & Co.



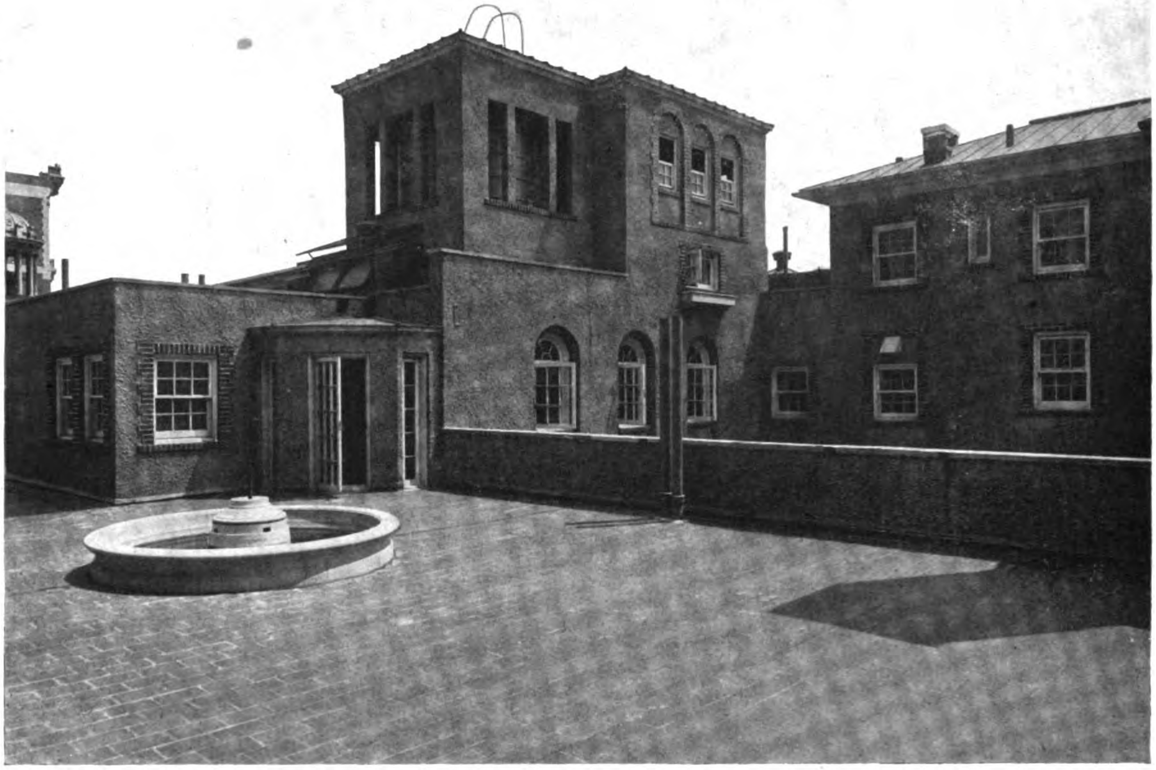
DINING ROOM, TOWN HOUSE CLUB.



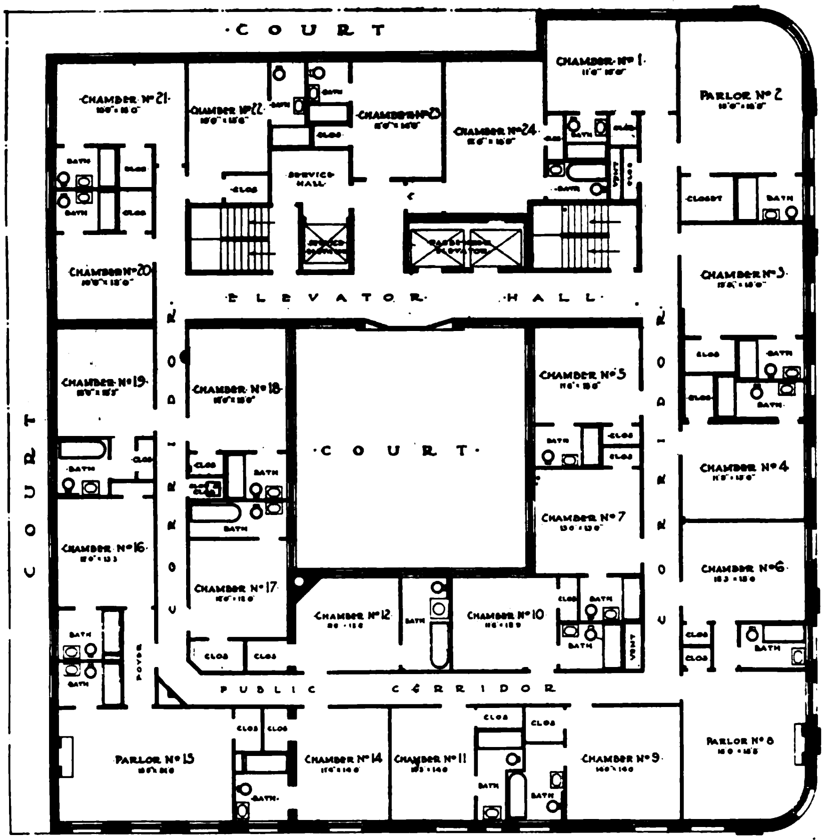
A CORNER OF REST ROOM, TOWN HOUSE CLUB, 71 CENTRAL PARK WEST, NEW YORK CITY.

Starrett & Van Vleck, Architects.

Built by Fred T. Ley & Co.; painting and decorating—The Barker Painting Co.; willow furniture—Minnet & Co.

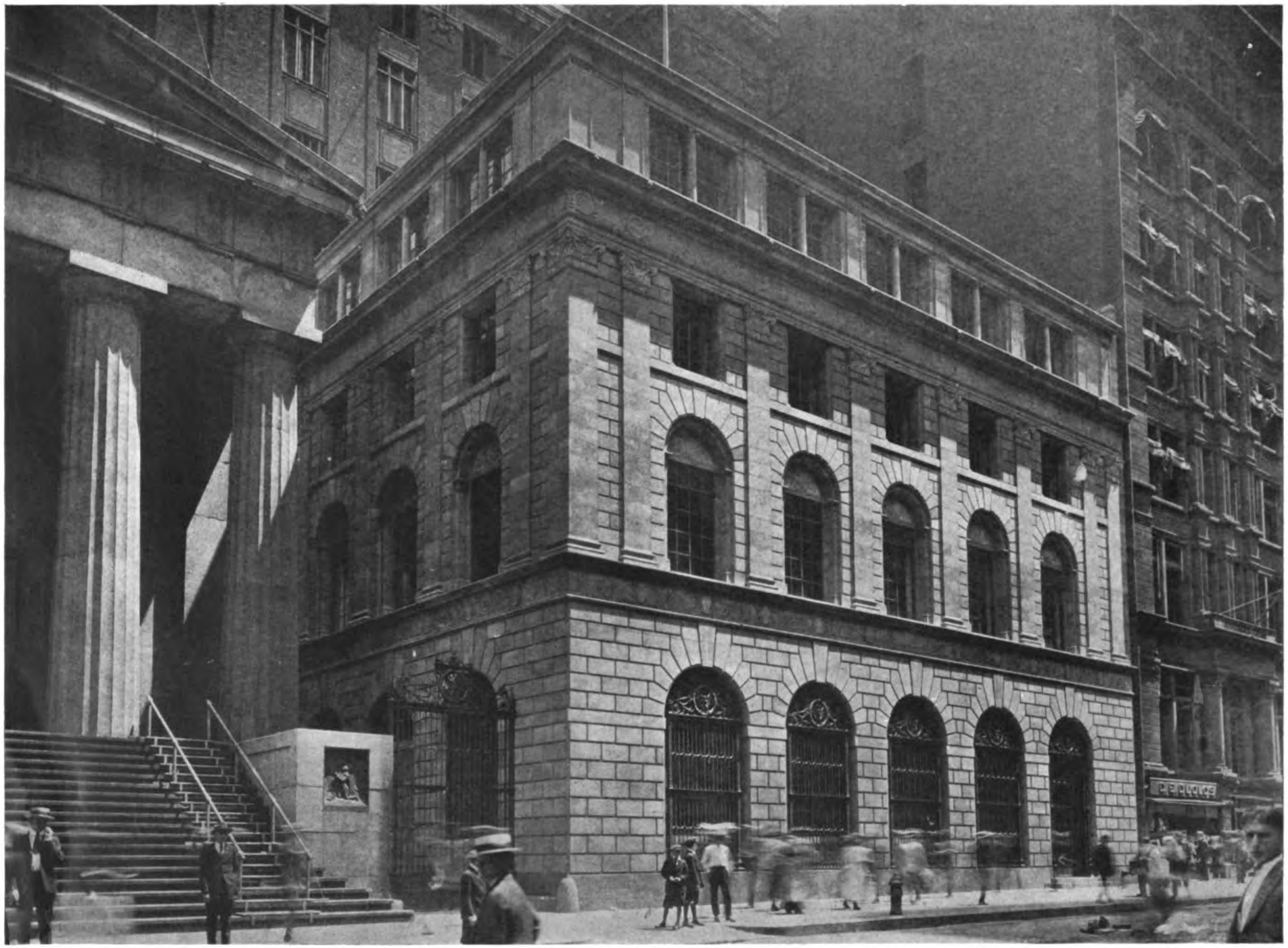


ROOF STADIUM, TOWN HOUSE CLUB.



TYPICAL FLOOR PLAN, TOWN HOUSE CLUB, 71 CENTRAL PARK WEST, NEW YORK CITY.

Starrett & Van Vleck, Architects.



ARCHITECTURE AND BUILDING. Plate 112.

Built by C. T. Wills, Inc.; cut stone—David Miller Co.; cement floors and walks—Harrison & Meyer; ornamental iron—Stoller & Cook Co.; elevators—A. B. See Electric Elevator Co.; vault built by York Safe & Lock Co.; reinforced concrete floors and vault—Easton Fireproofing Co.

U. S. ASSAY OFFICE, NEW YORK CITY.
York & Sawyer, Architects.
T. Kennard Thomson, Foundation Engineer.

for the men servants. An elevator in a circular tower extends from the basement to the living room in the top of the great tower, a room which overlooks the country on all sides. The second story contains most of the bedrooms of the house including Mrs. Belmont's suite occupying the end over the great hall.

In the basement in addition to the kitchens and service rooms there is a suite of offices used by Mrs. Belmont and a series of dressing rooms for guests who wish to use the bathing beach.

The Cauldwell-Wingate Company erected the building. The Hastings Pavement Company supplied the asphalt blocks and Harrison & Meyer laid all the cement walks and floors. J. N. Knight & Son installed the plumbing. Sexauer & Lemke supplied the gates and fences around the grounds.

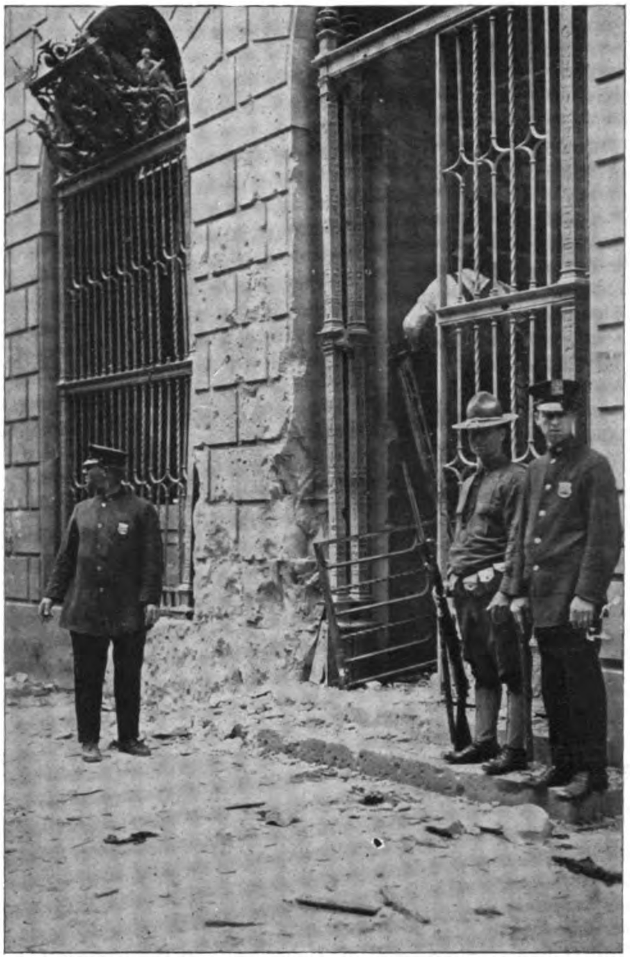
U. S. ASSAY OFFICE.

Announcement had already been made of the illustration of the new U. S. Assay Office, Wall and Broad Streets, New York City, for our September number. On September 16, at noon, a bomb explosion occurred in front of this building, causing damage to the exterior. The U. S. Assay Office, which was designed by York & Sawyer, architects, was one of the finest pieces of architecture in the financial section of New York City, and is was completed about the first of August.

A photograph showing the destruction was immediately secured, and it appears as one of our illustrations. This building contained many millions of bullion at that time, but the interior and vaults remained intact, which speaks very highly of the quality of the building, which was designed for strength as well as for beauty.

The damage to the building caused by the explosion will be repaired immediately and the passerby viewing the spot will find no marks of the disaster.

The U. S. Assay Office was built by C. T. Wills, Inc., and T. Kennard Thomson was the foundation engineer. David Miller Company did the cut stone work, and Harrison & Meyer laid the cement floors and walks. The ornamental iron work was executed by the Stoller & Cook Company. York Safe and Lock Company installed the bank vault, and the A. B. See Electric Elevator Company the elevators. The reinforced concrete floor and vault work was done by Easton Fireproofing Corporation.



U. S. ASSAY OFFICE, SHOWING BOMB EXPLOSION AT NOON, SEPTEMBER 16, 1920. (Photograph taken one hour after.)

TOWN HOUSE CLUB.

The remodeling of a seven story apartment house with three apartments to the floor into an apartment hotel presents no unusual problem in construction. Let it suffice that this was done, the first story being altered to provide the ordinary public rooms of a small hotel and the basement the necessary kitchen and mechanical equipment. The stories from the second to the seventh inclusive are divided into rooms as shown by the typical plan and the roof has two apartments with roof gardens adjoining each. The furnishing of the building was included in the construction contract except for the stories including the fifth and above. The interesting things about this building are the fact that it is co-operatively owned and the form of contract under which it was constructed and is being operated.

The contracting firm of Fred T. Ley & Co., Inc. promoted the project and did the construction work according to the plans of Starrett and Van Vleck. The essentials of the agreement are expressed in the following quotation from the contract with 71 Central Park West, Inc., known as the owner:

"A building contract based on said architects' plans and specifications shall be entered into between the owner and contractor which will provide that the price paid to the contractor by the owner shall include all carrying charges during construction, incorporation fees and organization tax of the owner, architects' commissions, insurance during construction and all other charges which would become a lien upon the said building up to and including the date when the final certificates shall be issued out of the Building Department of the City of New York, and that the building will be completed and turned over to the owners as completed as of the date when the final certificates are issued out of the Building Department of the City of New York, free from any encumbrances or liens against the owner, except the mortgage or mortgages hereinafter mentioned and any leases which the owner shall have contracted.

"Said contract shall further provide that at the time of the payment of each and every installment provided to be made by the terms of the subscription agreement hereto annexed, there shall be no uncancelled mechanics' liens of record against said building.

"The plans prepared by the owner's architects and submitted to the subscribers herewith shall before work is commenced be approved by the Tenement

House Department or the Building Department of the City of New York, or by any other Municipal or State department having jurisdiction over the reconstruction of said building.

"Any changes in the plans and specifications of said building required by any of said departments or by any company making a building loan upon said building or any minor changes suggested by the owner's architects, may be made by the contractor without further notice to the subscribers hereto.

"The general plans and specifications of the architects are ratified and approved by the subscribers upon signing the subscription agreement.

"Subscribers who desire to make any change or alterations from the typical plan of the apartments selected by them, shall make such changes within thirty days after signing the subscription agreement, but no change or variation therefrom shall be made except on written order filed with and accepted in writing by the contractor. If no such order is filed and accepted within thirty days, the subscriber will be deemed to have ratified the said typical plan of the apartment selected by him.

"The subscriber will agree to pay the contractor for all changes and alterations from the typical plan which require additional materials or equipment and will be credited with any omissions therefrom. All apartments will be delivered in white plaster without decorations, according to the specifications of the architects, but all rental portions of the building shall be delivered completely decorated and furnished.

"The owner will agree to purchase from the contractor and the contractor will agree to sell to the owner subject to the mortgages, leases and restrictions herein mentioned, the land, building, equipment and furniture upon the following terms and conditions:

In consideration of the entire capital stock of the owner, full paid and non-assessable and not liable to any future call...	$357,500
The land and premises shall at the time of the completion of the project be subject to a mortgage or mortgages not in excess of	450,000
Total investment..................	$807,500

"It is contemplated that all of the capital stock shall be issued in the first instance to Fred T. Ley & Co., Inc., in consideration for the transfer of the property, building now erected thereon, and the agreement of the Fred T. Ley & Company, Inc., to carry out the reconstruction work as herein indicated.

"The contractor agrees to finance the proposition of the contemplated mortgage loans up to $450,000; taxes and insurance to be apportioned as of the date of completion and delivery.

"The necessary bonds and mortgages required in such financing are to be executed by the owner on request of the contractor.

"It is contemplated that Fred T. Ley & Co., Inc. may sell all or any part of the full paid stock issued to it as aforesaid to the subscribers hereto, who shall have the privilege of subscribing for the apartments hereinafter mentioned."

The subscription agreement is in the following form:—

"The undersigned having read and approved the foregoing plan of organization covering the reconstruction of remodeling of 71 Central Park West, for valuable consideration received and in consideration of the mutual agreements herein contained each for himself agrees to and with the subscribers hereto and with Fred T. Ley & Co., to purchase.......... shares of the capital stock at One Hundred Dollars ($100) per share of 71 Central Park West, Inc., when incorporated (full paid and non-assessable) and to pay to Fred T. Ley & Co., Inc., the full par value thereof in cash amounting to...............Dollars ($......) when called for by said Fred T. Ley & Co., Inc., in the following installments in accordance with the terms of this subscription agreement."

The terms of payment are on a percentage basis dependent on the stage of completion of the building. Stock is delivered on full payment.

"The mortgage or mortgages on said premises upon completion shall not exceed $450,000 and interest not exceeding 5½% per annum from date of delivery to the owner, and the said mortgage or mortgages shall constitute the only indebtedness against the owner at the time the building is turned over as completed and the capital stock of the owner shall not exceed $357,500."

The subscriber purchases a number of shares in accordance with the price set upon the apartment selected by him and is entitled to the permanent occupancy thereof upon completion. The portion of the building that may be thus occupied is limited by the amount of the capital stock of the corporation and by the space apportioned upon this valuation. Thus it is provided that there is always a sufficient area available for public occupancy to carry the expense of the building. The apartments occupied by owners are subject to a fixed annual rental at the rate of 4% per year, based upon the amount of stock if needed to defray carrying charges.

The annual income is estimated at $110,770.00 including the 4% assessment—in amount of $14,300.00. The estimated operating expense and carrying charges are $85,860.00 providing a surplus of $24,910.00 to be applied on retiring the mortgage.

"The plans provide for a kitchen and restaurant service, which may be rented on a percentage basis to an outside restaurant corporation whose business it is to lease such privileges, paying for same an agreed upon per cent. on gross receipts. As, however, the income from this source is not determinable, it has been deemed advisable to omit this source of income from the schedule of earnings."

For the operation of the house other than the restaurant a paid staff under a manager is provided for in the itemized statement of operating expenses. Full hotel service is included for both the stock owning occupants and the transient guests.

All the painting and decorating in this club building was done by The Barker Painting Company. Special attention was given to the furniture used in the lobby, writing rooms and bedroom suites. This contract was handled by A. Pancani. Some fine pieces of willow furniture of special design were supplied for the Patio and the Rest Room by Minnet & Co. Watson Elevator Company supplied the elevators and the Richards-Wilcox Mfg. Co. supplied the elevator door equipment.

October

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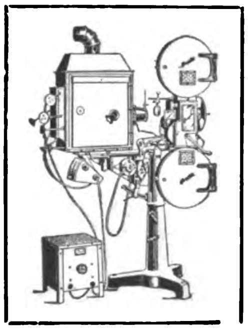
AND MANY OTHERS



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Volume LII

Number 10

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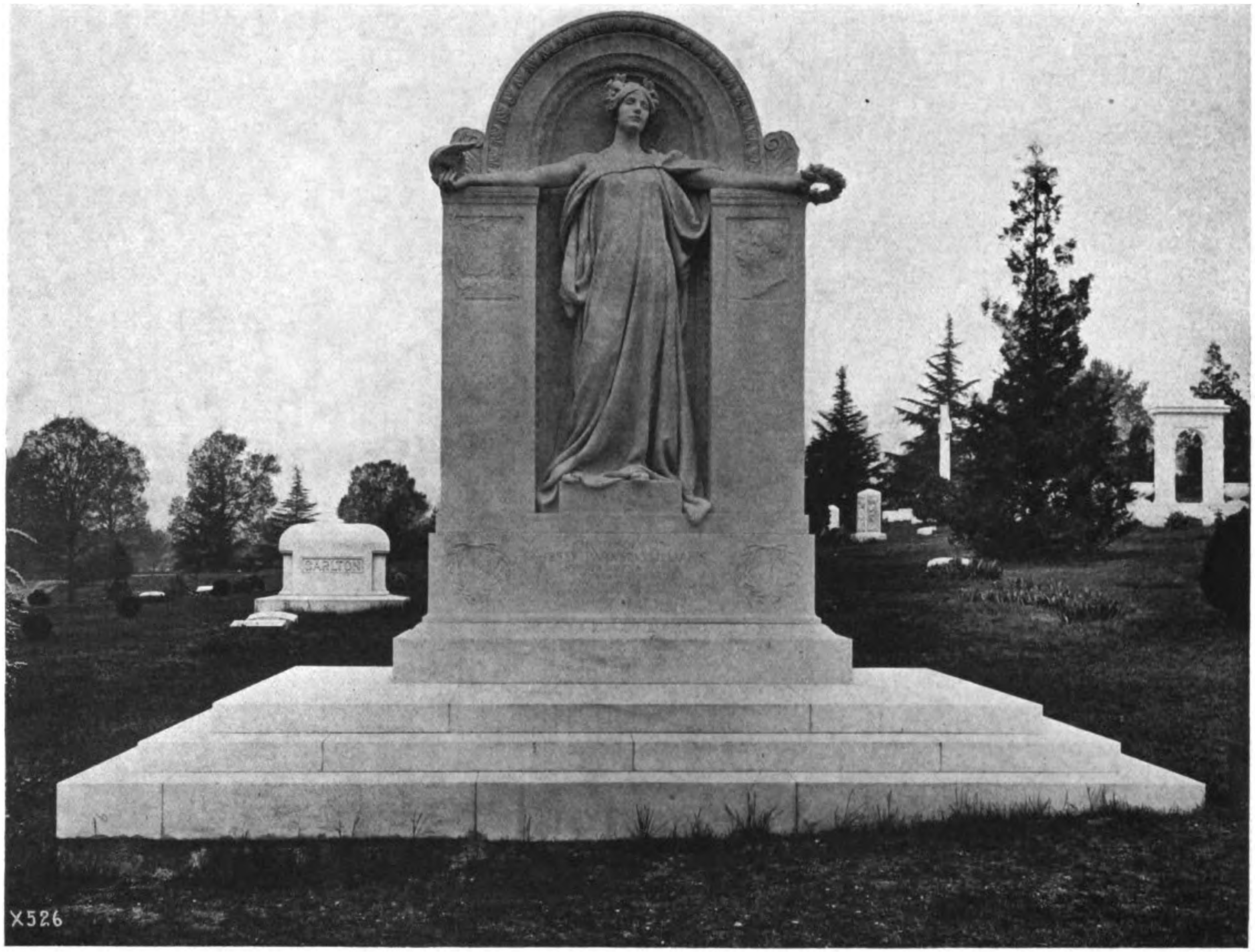


WILLIAMS MEMORIAL, WEST VIEW CEMETERY, ATLANTA, GA.

Henry Bacon, Architect.
Daniel Chester French, Sculptor.

Built of Georgia Marble.

ARCHITECTURE AND BUILDING

A Magazine Devoted to Contemporary Architectural Construction

WILLIAM P. COMSTOCK
Managing Editor

Volume LII OCTOBER, 1920 Number 10

THE CUNARD BUILDING.

The location of the Cunard Building is of peculiar historical interest. Across Morris street, a few feet to the north, were erected the first white habitations on Manhattan Island, when Captain Adriaen Block built four huts to house the crew of the Tiger during the interval between the burning of that ship and the building of the Restless. With the buildings adjacent to the south, the Bowling Green Building and the Washington Building, the Cunard Building occupies the site of the first Dutch city of New Amsterdam. At 1 Broadway, under the Washington Building, is the site of Kock's Tavern, British headquarters during the Revolution. Where the Bowling Green Building now stands at 9 Broadway, was for many years the well-known Atlantic Garden. Bowling Green, upon which the Cunard Building faces, was for two centuries the social center of New Amsterdam and of New York. It still retains in part the hand-wrought, soft, iron railing put up over a century ago. At 3 Morris street, in a dingy worn house which has for several years been a boarding house for Bulgarian emigrants, once lived Aaron Burr when that gentleman was water commissioner of the city of New York. The Stevens House, on the Broadway and Morris street corner, was for a long period, especially during the decade immediately preceding the Civil War, the fashionable hotel of the city. Its register during that period reads like a combined Who's Who and Social Directory. It has existed in its present form since 1846, when it was remodelled by the original Charles Delmonico and for many years housed his restaurant.

To the person interested in the sentimental and historic aspects of New York City there is something peculiarly fitting in the rescue of this piece of land from the base uses to which it had descended in the last generation and in the erection thereupon of a building which will not only be a model skyscraper, but which will have a historic interest of its own as the largest building ever erected by a steamship company the first to be built in this country by a British steamship corporation.

As indicating the confidence of this steamship organization in the future business relations between this country and Great Britain, the project is highly significant. It is also worthy of noticing that the negotiations for the acquisition of the plot were begun during the war itself and were consummated February 21, 1918, nine months before the success of the Allied arms.

The acquisition of the plot itself involved some $5,000,000, and it is expected that more than twice that sum will be expended in addition to complete the structure. The base area is 48,400 square feet, which is about 2,000 square feet less than the base of the Equitable Building, the largest office building in the world.

The Cunard Building will be twenty-one stories in height from the Broadway curb, with rentable floor space varying on the different floors from 25,000 to 30,000 square feet, each with a total floor area of more than 700,000 square feet. Of this the Cunard Line reserve for their own use the basement and the first three stories, leaving more than 500,000 square feet available for renting purposes. The Cunard Steamship Company, Ltd., the Anchor Line, the Anchor-Donaldson Line, and other allied and subsidiary lines of the Cunard company, will have their New York offices in the building.

The Cunard Building offers unusual opportunity to business interests seeking adequate floor space at the southern tip of Manhattan Island, where the world's of shipping, finance and big business meet and where each year the rentable space grows more and more limited. To remain in this location many organizations have been compelled to erect their own buildings. Tenants of the Twenty-five Broadway Corporation (the operating company) who so desire, may obtain twenty-one-year leases and thus secure a guarantee of reasonable permanency of location without the responsibilities of a privately owned building.

More than two years have been spent in the study of the problem and in the preparation of the plans and the building will embody the best possible practice and experience in every detail relating to a modern office building of the best type. Advantage has been taken of every recent improvement tending either to increase the comfort of the tenant or expedite his business. As a characteristic detail it may be mentioned that there will be twenty-eight high speed passenger elevators. The freight elevators are totally distinct from the passenger service with a separate approach. The entrance halls will not be covered up with newsstands, cigar booths, bootblacks and other miscellaneous minor business adventures which have been tolerated in many of the bigger New York buildings. The building's architectural style expresses in plan and construction the present day, the general type being an adaptation of the Italian Renaissance.

Certain unusual features in the location of the plot have been taken advantage of by the architects, Benjamin Wistar Morris, associated with Carrere & Hastings, and appear in the resulting floor plan. The site is opposite the upper end of Bowling Green where Broadway widens out to contain the Bowling Green Park, and faces the southern end of Trinity Place where that street widens out into an open square as it turns into Greenwich street. The floor plans show that there are no interior courts, but in the center of the northerly frontage on Morris street and at the southwesterly corner on Greenwich street, there are two open courts much wider than the average street in lower New York. There are no inside offices for rent in the building. The building is of fireproof skeleton steel construction, the Broadway front being entirely of stone and the remaining fronts of stone, brick and terra cotta.

Perhaps the most striking feature about the new building to the public will be the great hall provided for the passenger department of the Cunard and its allied and subsidiary lines. This room is the largest of its kind in this country, and probably in the world, devoted to steamship traffic. It compares rather with a large auditorium or with the terminal waiting rooms of our railway systems than with the average steamship ticket office as it now exists. The floor plans show that the great hall has a length of 185 feet, a width of 74 feet and a height of 65 feet. These figures may perhaps mean more when it is realized that they represent a height greater than the average six-story city building, three times the width and nearly double the length. In other words, the future Cunard passenger may make his arrangements in a hall the size of a six-story building covering nearly six city lots. This will occupy the major space of the grade floor and the first three stories.

Provision has been made in the plans for the housing of a bank at the Broadway and Morris street corner. This has been made a complete unit separable from the rest of the building, with private elevators to the fourth floor and safe deposit vaults in the basement.

The new building regulations of the city of New York are responsible for the terraced effect above the eighteenth floor to be seen in the perspective. It will be noted that the architects have skillfully contrived the sky-line so as to conceal the necessary paraphernalia of a big building, such as pent houses, tanks and steam stacks.

This building is being erected by Todd, Irons & Robertson, Inc. Clyde R. Place is the consulting engineer for the plumbing and elevators, and Meyer, Strong & Jones, Inc., are the consulting engineers for the steam, heating, ventilating and electric wiring. Robert W. Hunt & Co. were the engineers for the steel inspection. An important item for the interior of this building is the office partitions. Years ago tenants would furnish their own partitions and would move old partitions from one building to another, and in replacing the partitions always mutilated the building. However, for this building all partitions are furnished by the owners and this contract will be executed by David Kramer. The W. G. Cornell Company installed the plumbing. Sexauer & Lemke, Inc., did the ornamental iron work.

THE TEXTILE BUILDING.

An extensive improvement to what is now commercially considered lower Fifth Avenue is now under construction between Thirtieth and Thirty-first streets upon the east side of the avenue. This space has long been occupied by a number of old buildings mostly altered residences, and the new building will be a decided improvement to the neighborhood. Its frontages are 200 feet on the avenue, a like distance on Thirty-first street and 165 feet on Thirtieth street. The height is sixteen stories with a setback in compliance with the zoning law at the sixteenth floor level. The first three stories of the elevations will be built of limestone with the upper walls of face brick with terra cotta trim.

Each floor will contain 36,000 square feet gross, of which the net rental space will be 31,000 square feet. The entire rental area in the building will be 525,000 square feet.

The building will be served by ten Otis elevators, six being passenger, three of which will run at express speed of 600 feet per minute, two being combination passenger and freight elevators, and two elevators for freight alone. There will be four staircases, one of which will be a fire tower complying with all department regulations. There will be a freight entrance on the Thirtieth street side, 17 feet wide, which will lead into an open trucking space, and adjoining it will be a loading platform with direct access to four of the elevators.

The architects are Sommerfeld and Steckler and the engineers Christian J. Jeppesen, Inc. The George Backer Construction Company are the builders. The foundation is carried to bed rock by steel concrete piles which support the column loads. Counter balanced windows of the "Truscon" type are used throughout. In the heating plant five Fitzgibbon boilers are used. Mr. George Backer is the owner of this building and he is building for his own use a four-room bungalow on the roof. A. R. Zicha Marble Company did the interior marble work. The metal-covered doors have been supplied by Betz Bros., Inc., and the copper work and cornices have been executed by A. E. Stearns. Cutler mail chutes are used. Richards-Wilcox Mfg. Co. supplied the elevator door equipment.

THE DAUGHTERS OF JACOB HOME.

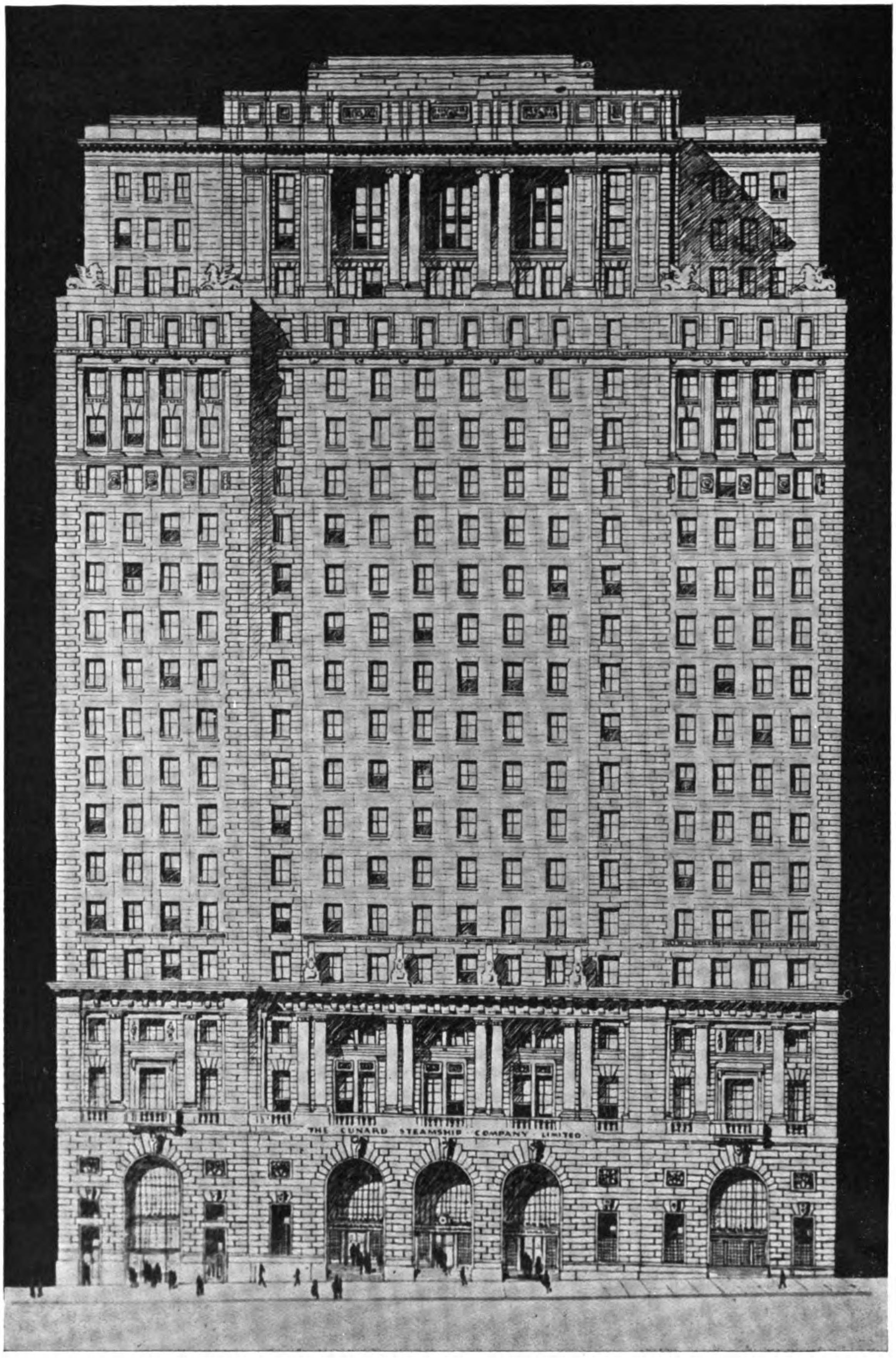
A wide driveway winds up the hill from the entrance gates through grounds which will soon be planted to the imposing entrance of the new home of the Daughters of Jacob. The building of unusual design overlooks its surroundings in its prominent location at Findlay avenue and 167th street in the Borough of Bronx, New York City. The plan at once calls attention to the building and its economy of arrangement is a matter to be noted.

The structure is in the shape of a great rimless wheel, its eight wings radiating like spokes from the central building. Each dormitory occupies the width of a wing, so that plenty of sunlight and air can be obtained. The private room sections are arranged in a somewhat similar manner with a hallway connecting them with the central building. The building has five stories with a basement and sub-basement, and is built of fireproof material throughout. It is principally of brick with tile and concrete floors and walls, and there is not a piece of wood in its construction.

In the first story is a synagogue splendidly furnished and equipped, seating from six to seven hundred persons. The synagogue can also be used for entertainments, for a motion picture machine has been installed and a curtain placed behind the platform.

A library and reading room, where the inmates spend much of their time is conveniently located on the first floor. Near the library are two sitting rooms—one for men and one for women.

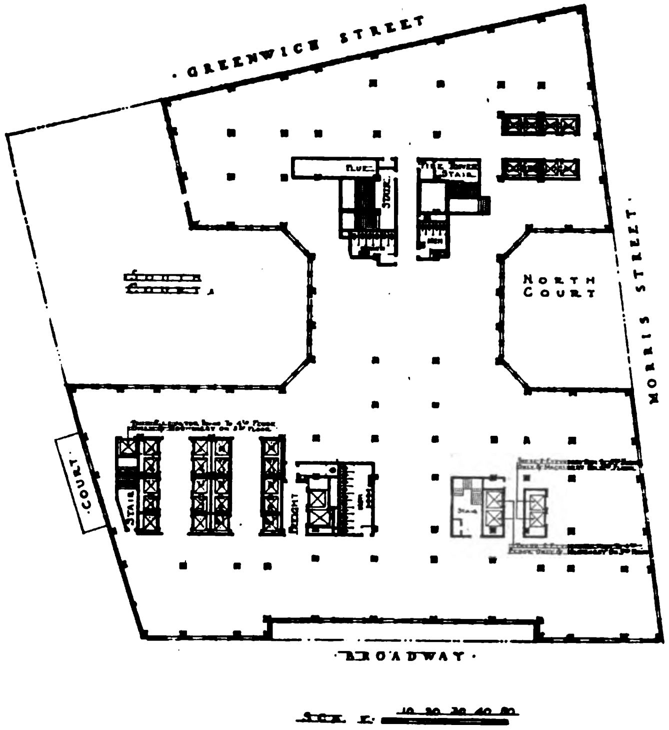
In addition to these accommodations there is also on the first floor the main dining room, with facilities for serving seven hundred persons. This room is divided into two sections, one for the nurses and


THE CUNARD STEAMSHIP COMPANY LIMITED

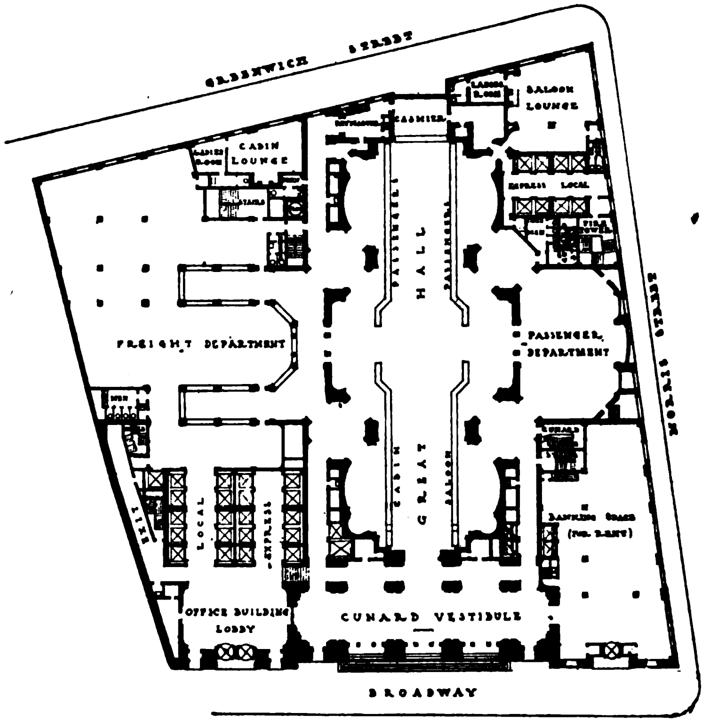
CUNARD BUILDING, 25 BROADWAY, NEW YORK CITY
Benjamin Wistar Morris, Architect.
Carrere & Hastings, Associate Architects.

ARCHITECTURE AND BUILDING. Plate 113.

Built by Todd, Irons & Robertson, Inc.; consulting engineers for steam, heating, ventilation and electric wiring—Meyer, Strong & Jones, Inc.; consulting engineer for the plumbing and elevators—Clyde R. Place; steel inspection engineers—Robert W. Hunt & Co.; plumbing—W. G. Cornell Co.; ornamental iron—Sexauer & Lemke, Inc.; office partitions—David Kramer.

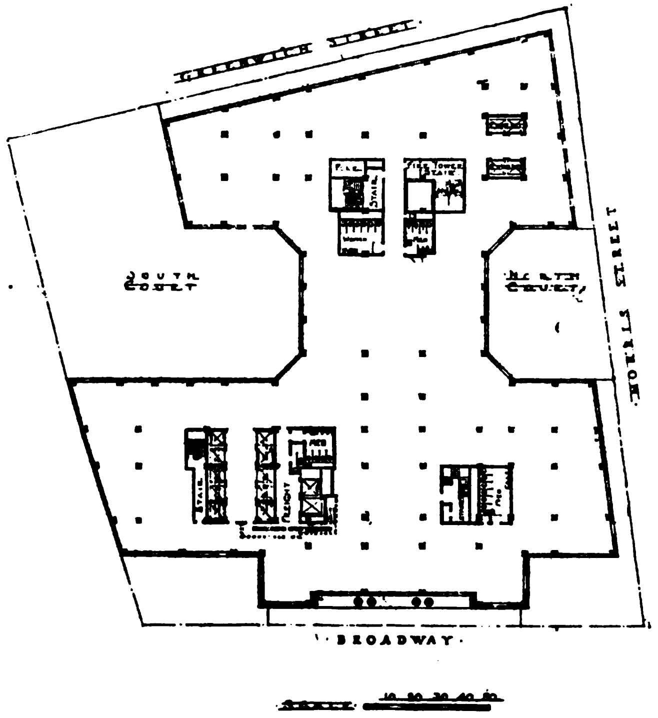


PLAN OF FIFTH FLOOR.

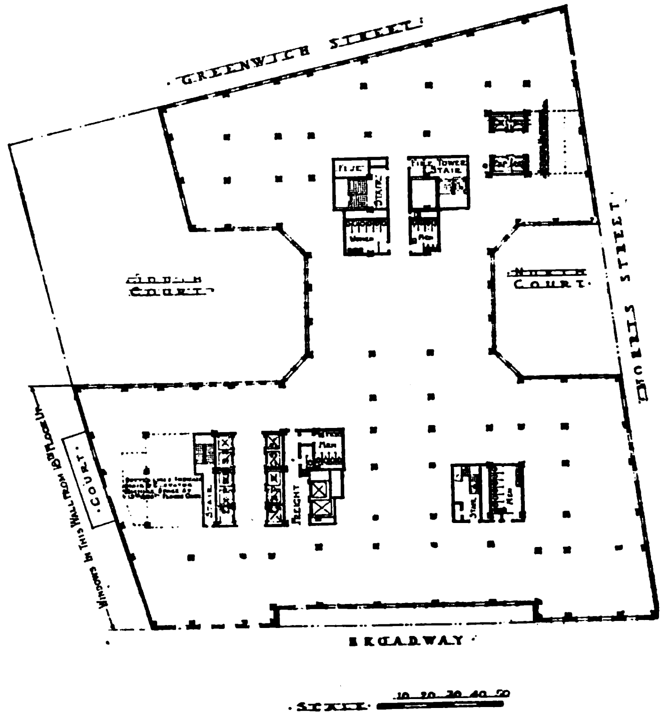


PLAN OF FIRST FLOOR.

CUNARD BUILDING, 25 BROADWAY, NEW YORK CITY.
Benjamin Wistar Morris, Architect.
Carrere & Hastings, Associate Architects.



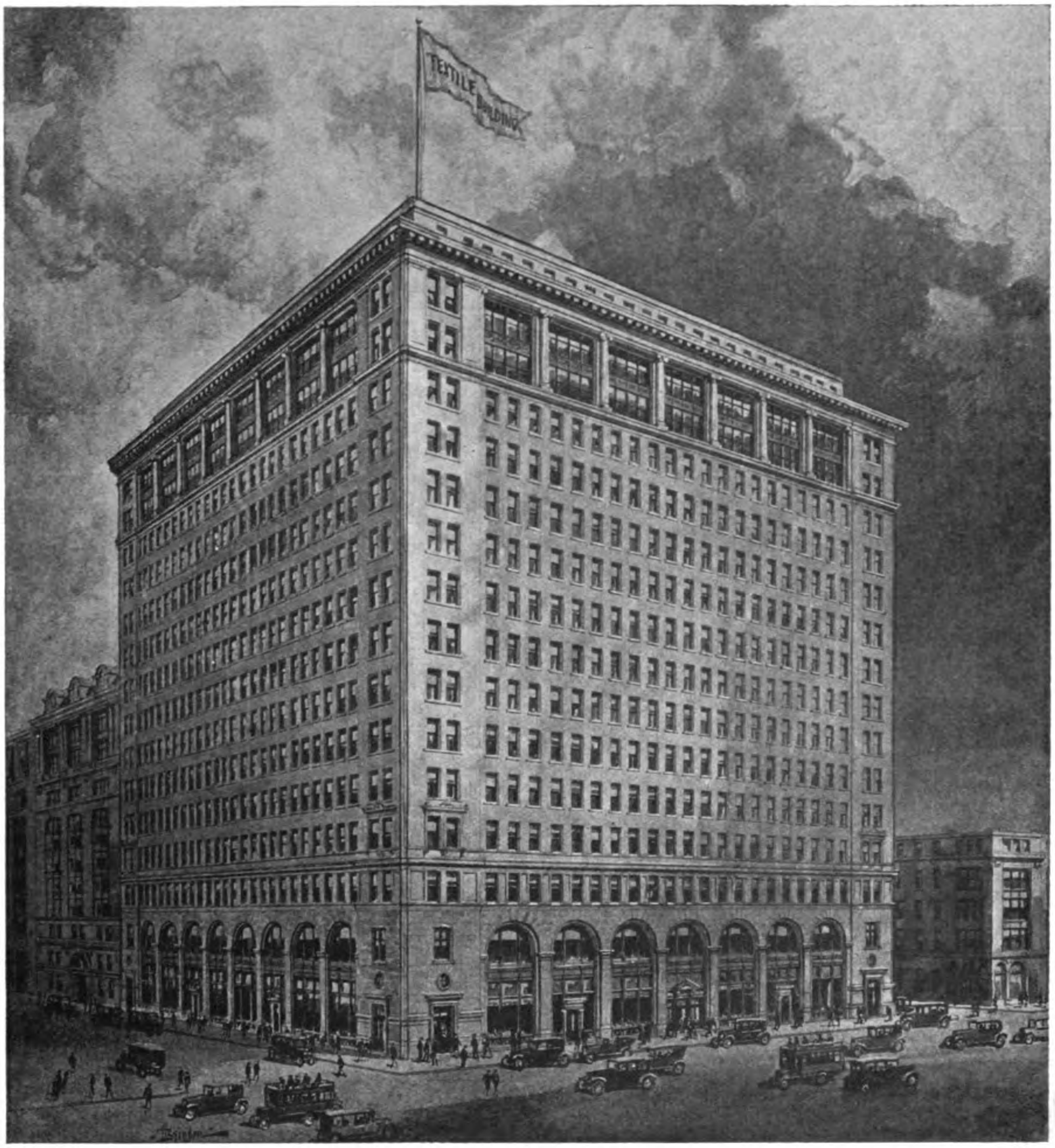
PLAN OF NINETEENTH TO TWENTY-FIRST FLOOR.



PLAN OF FIFTEENTH TO EIGHTEENTH FLOOR.

CUNARD BUILDING, 25 BROADWAY, NEW YORK CITY.
Benjamin Wistar Morris, Architect.
Carrere & Hastings, Associate Architects.

Architecture and Building. Plate 115.

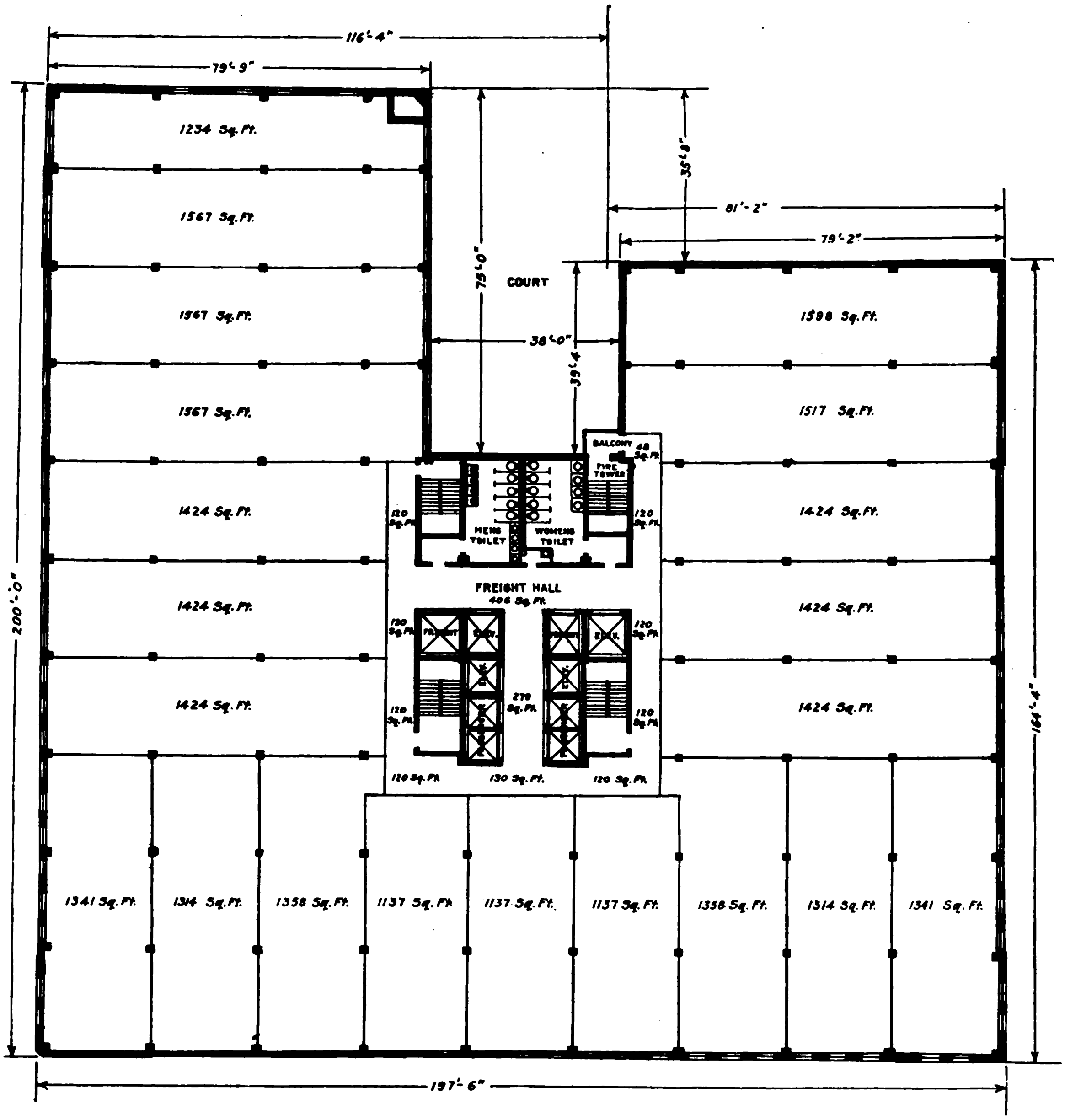


TEXTILE BUILDING, 30TH TO 31ST STREETS AND FIFTH AVENUE, NEW YORK CITY.

Sommerfeld & Steckler, Architects.

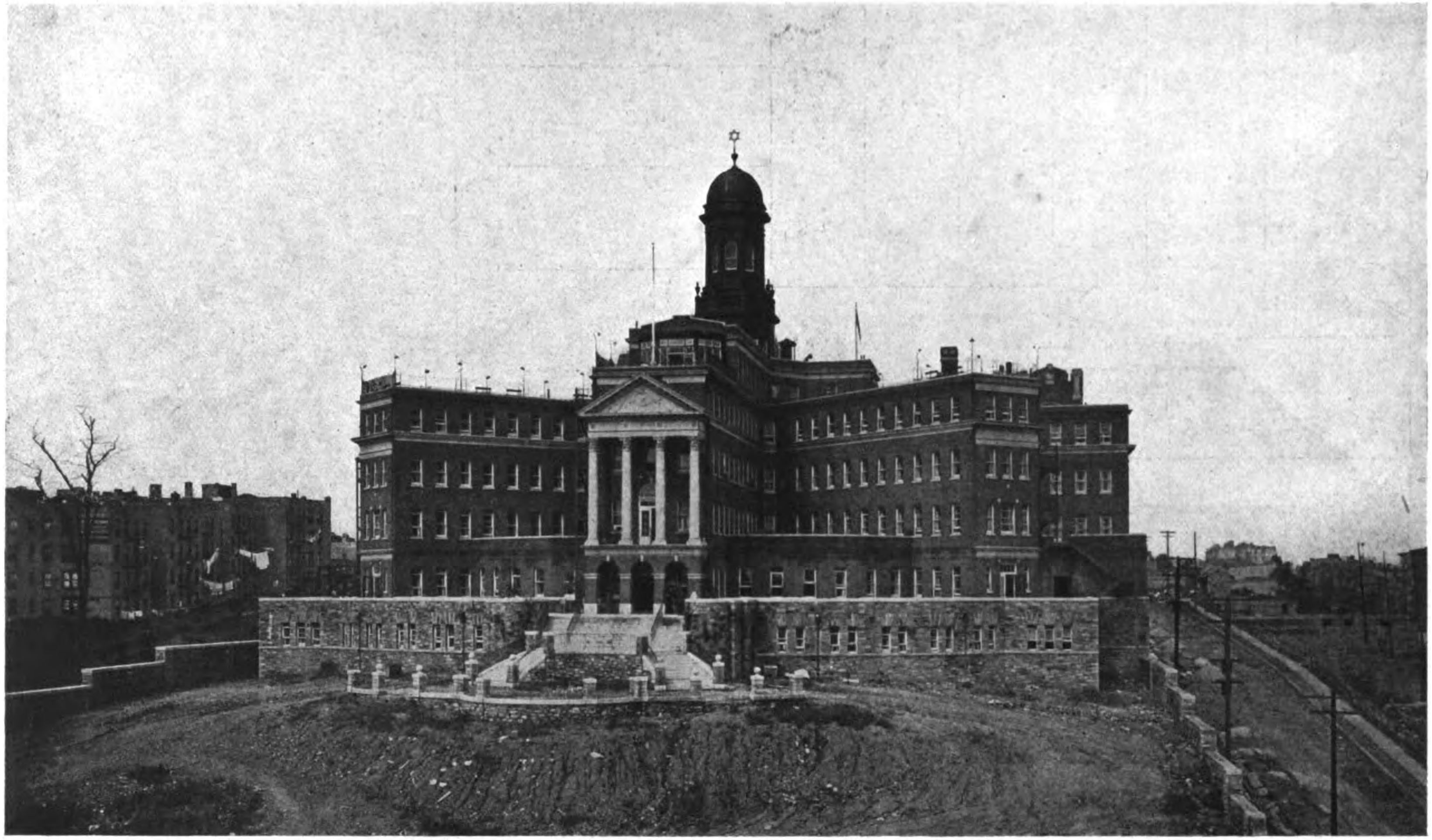
ARCHITECTURE AND BUILDING. Plate 116.

Built by George Backer Construction Company; marble work—A. R. Zicha Marble Co.; mail chutes—Cutler Mail Chute Co.; copper work and cornices—A. E. Stearns; boilers—Fitzgibbons Boiler Co.; hollow steel doors and interior trim—Betz Bros., Inc.; elevator door equipment—Richards-Wilcox Mfg. Co.



TYPICAL FLOOR PLAN, TEXTILE BUILDING, 30TH TO 31ST STREETS AND FIFTH AVENUE, NEW YORK CITY.

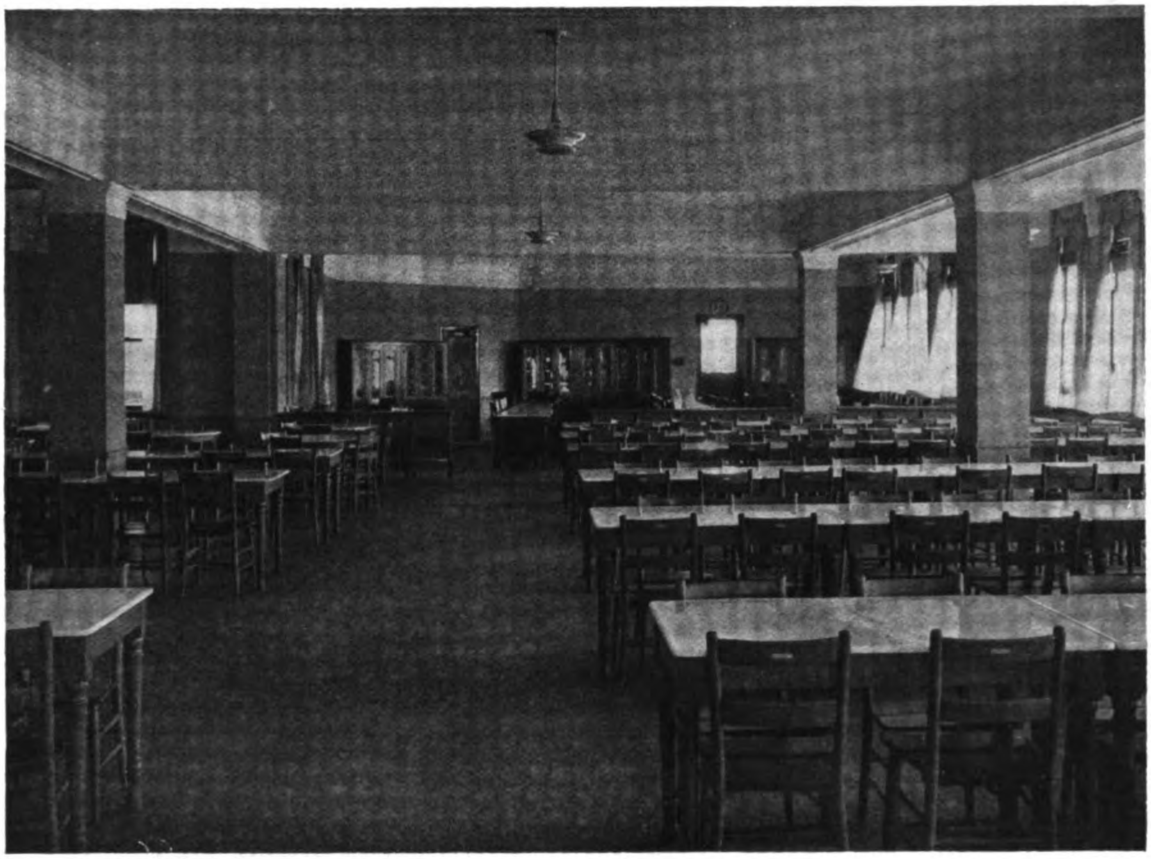
Sommerfeld & Steckler, Architects.



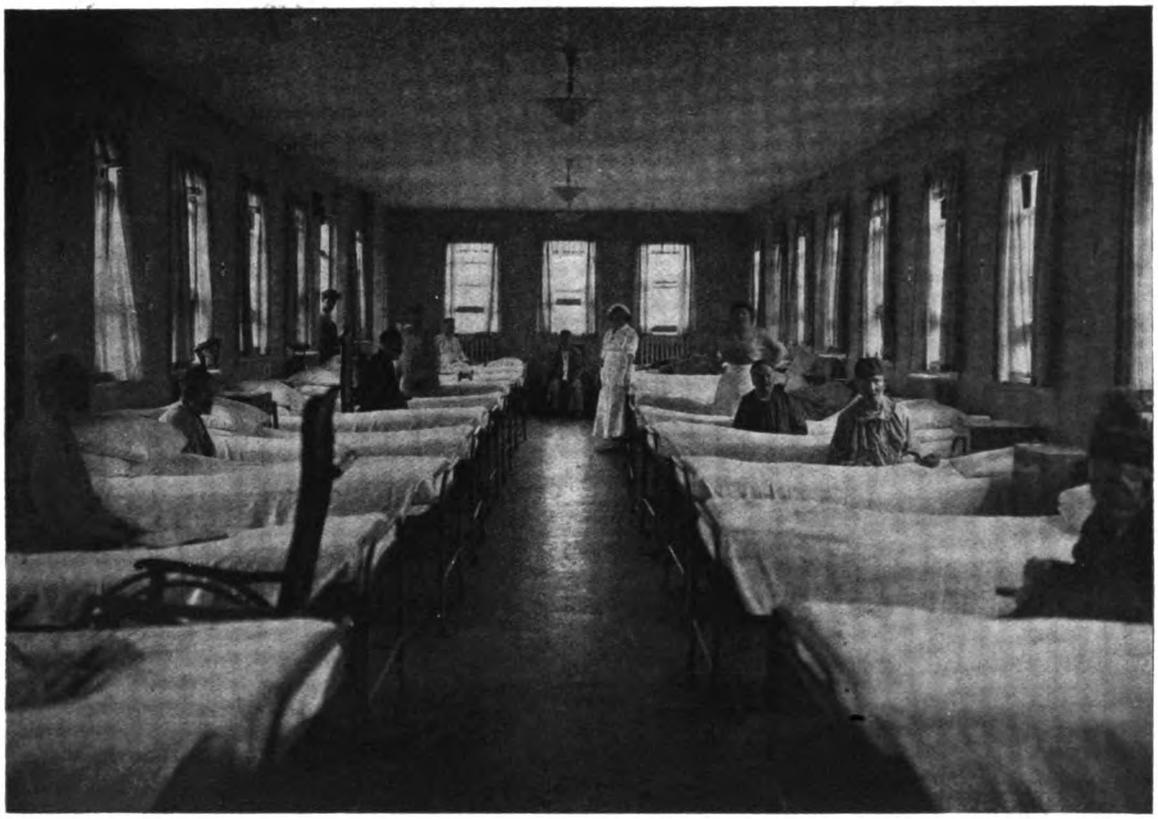
THE DAUGHTERS OF JACOB HOME, 167TH STREET AND FINDLAY AVENUE, NEW YORK CITY.

Louis Allen Abramson, Architect.

Built by G. Richard Davis & Co., Inc.; mason work—George Colon & Co.; cut cast stone—Benedict Stone Corporation.



A SECTION OF THE DINING ROOM.

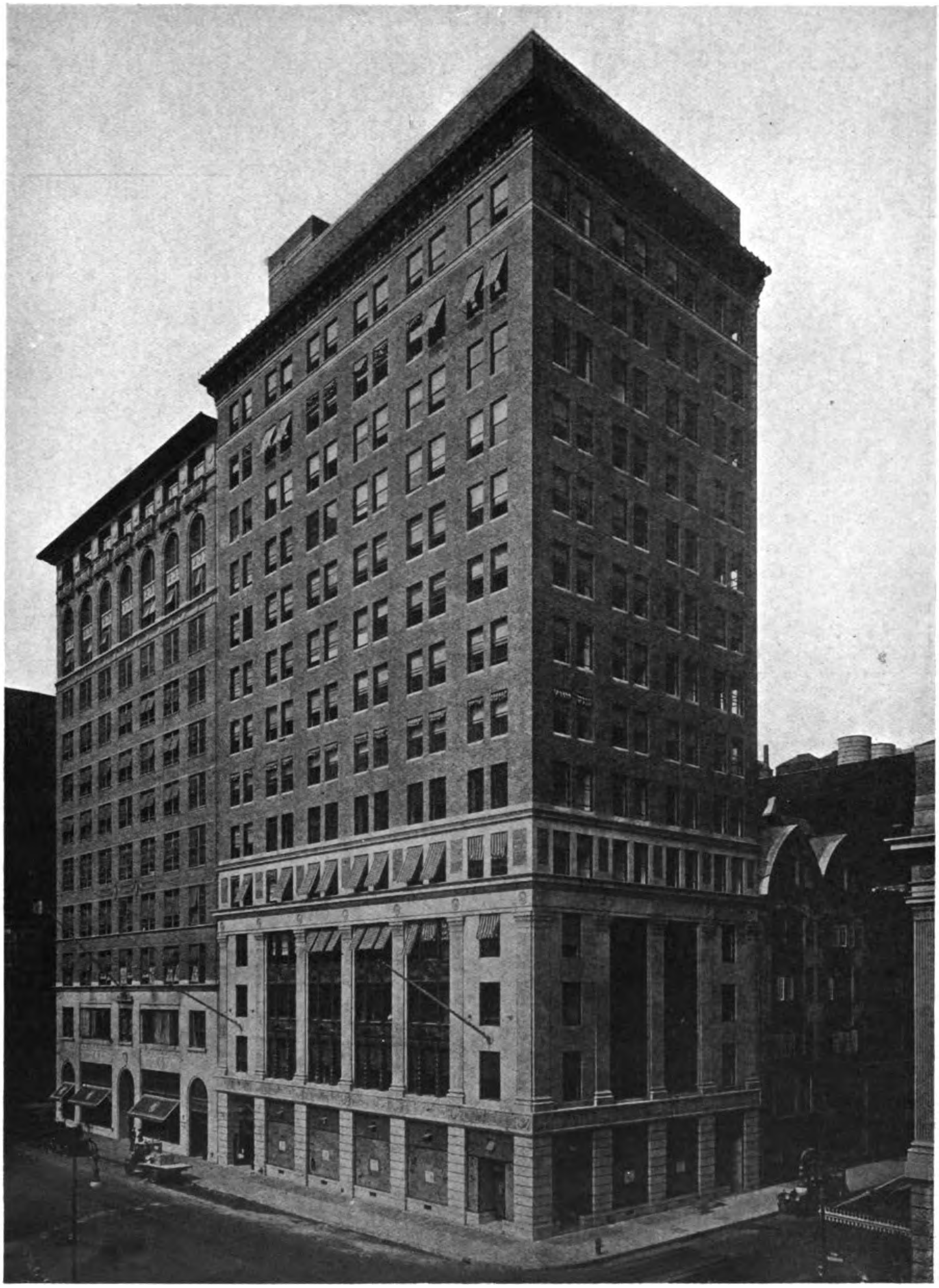


HOSPITAL WARD, THE DAUGHTERS OF JACOB HOME, 167TH STREET AND FINDLAY AVENUE, NEW YORK CITY.

Louis Allen Abramson, Architect.

ARCHITECTURE AND BUILDING. Plate 119.

Built by G. Richard Davis & Co.; mason work—George Colon & Co.; painting contractors—The Shatz Painting Co., Inc.; Frink reflectors used.

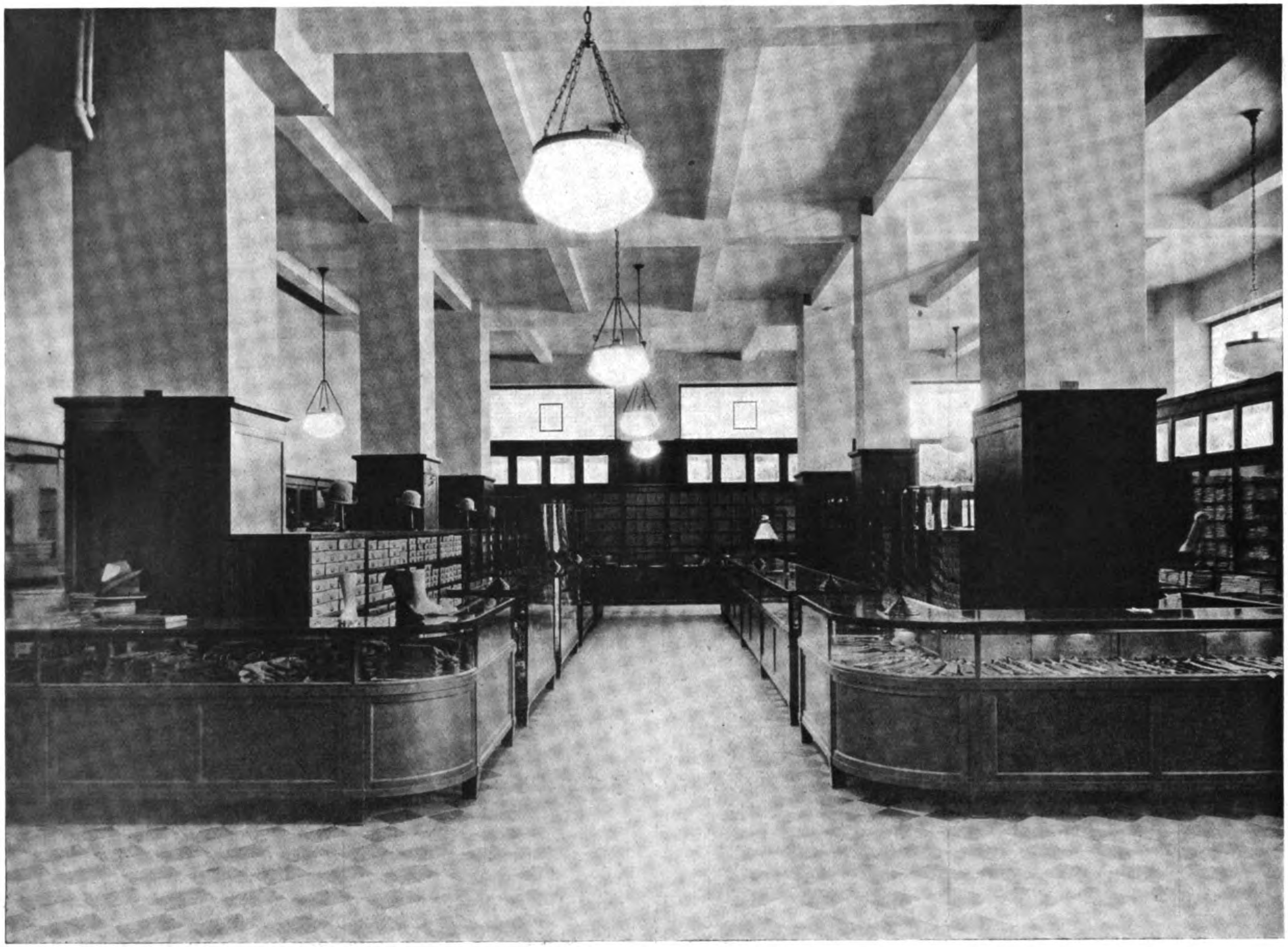


MARLIN-ROCKWELL BUILDING, 45TH TO 46TH STREETS AND MADISON AVENUE, NEW YORK CITY.

Warren & Wetmore, Architects.

ARCHITECTURE AND BUILDING. Plate 120.

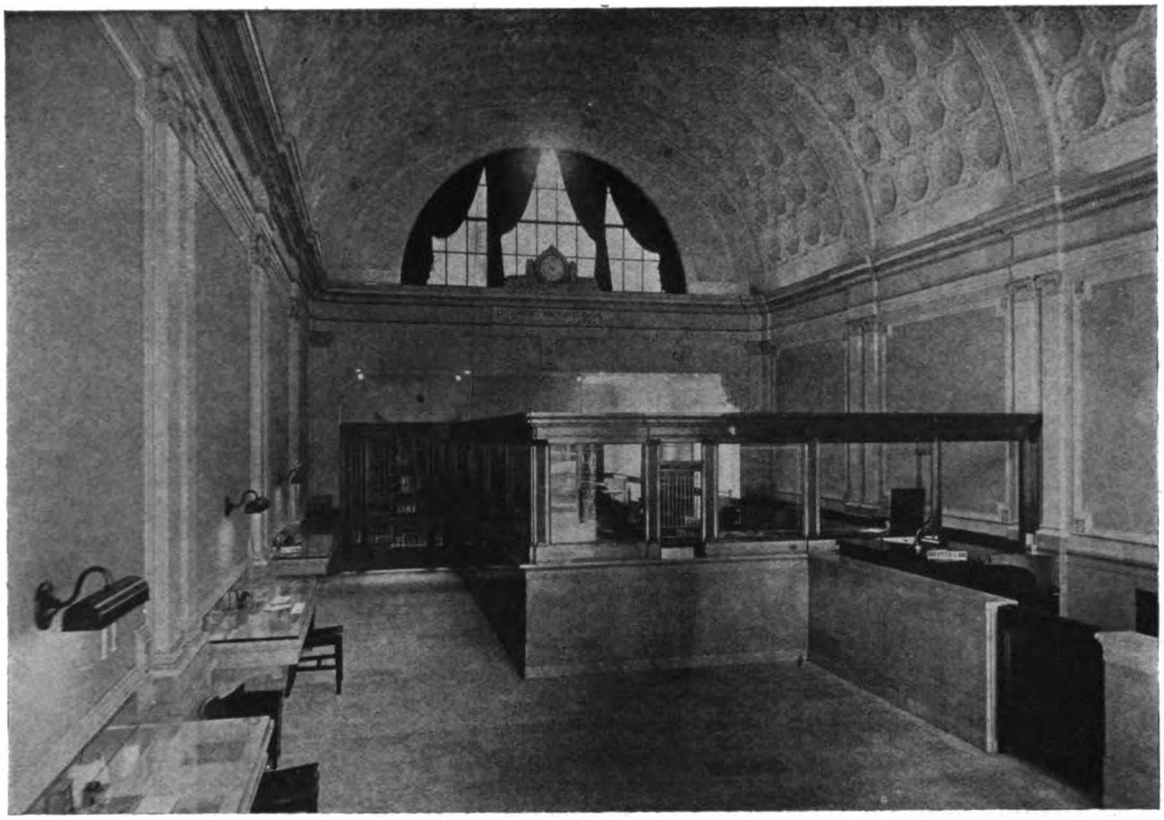
Built by Cauldwell-Wingate Co.; electrical contractors—J. Livingston & Co., Inc.; plumbing—J. N. Knight & Son; tile and slag roofing—T. New Construction Co.; Elevator door hangers—Richards-Wilcox Mfg. Co.; lighting fixtures—R. C. Heather Co.; directory boards—The Tablet & Ticket Co.

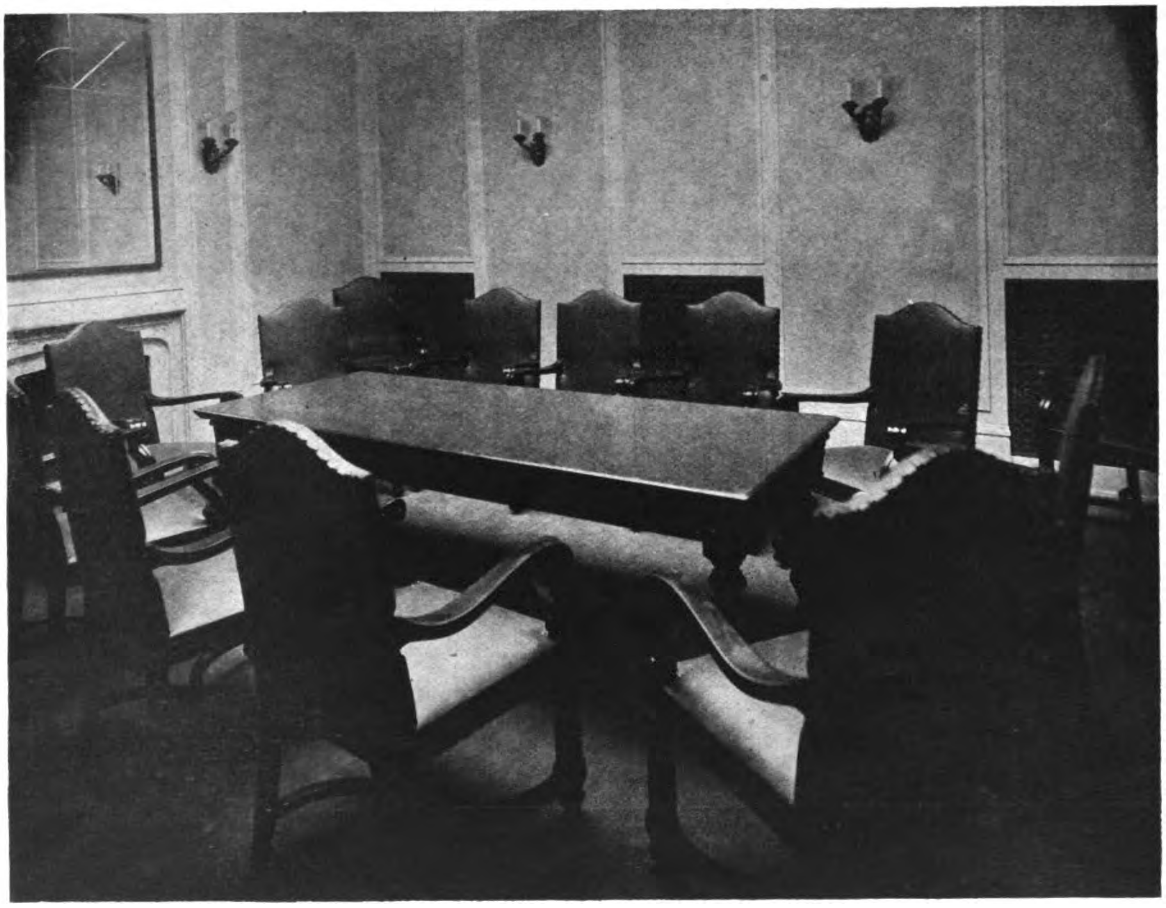


F. R. TRIPLER STORE LOCATED IN MARLIN-ROCKWELL BUILDING, 45TH TO 46TH STREETS AND MADISON AVENUE, NEW YORK CITY.

Warren & Wetmore, Architects.

Architecture and Building. Plate 121.
Built by Cauldwell-Wingate Co.; electrical contractors—J. Livingston & Co., Inc.; store fixtures—Goertz Bros., Inc.; lighting fixtures—R. C. Heather Co.

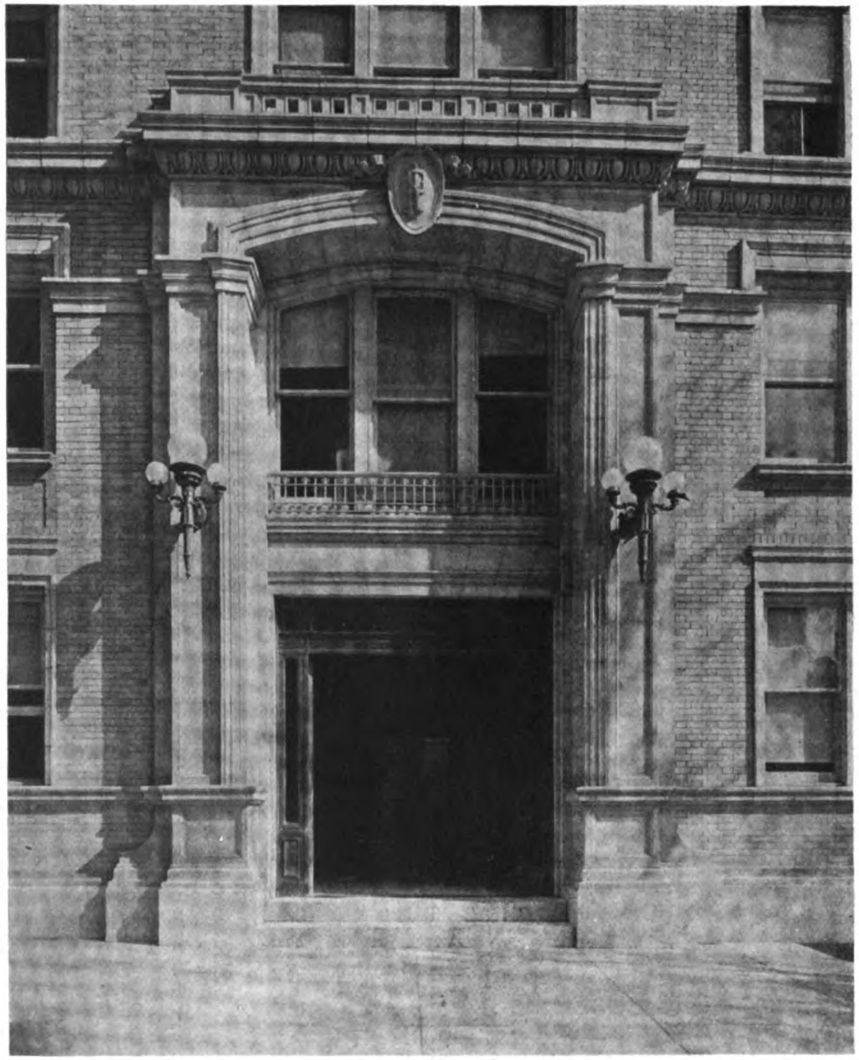


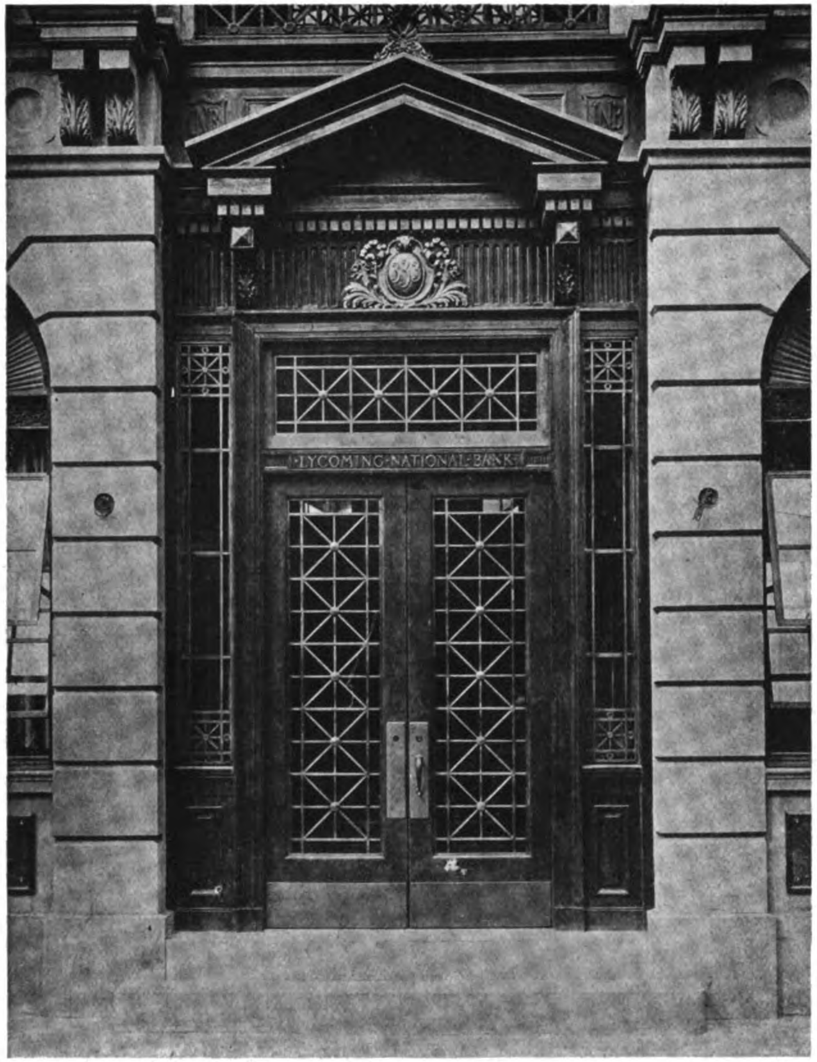


LYCOMING NATIONAL BANK, WILLIAMSPORT, PA.
Charles W. Feil, Architect.

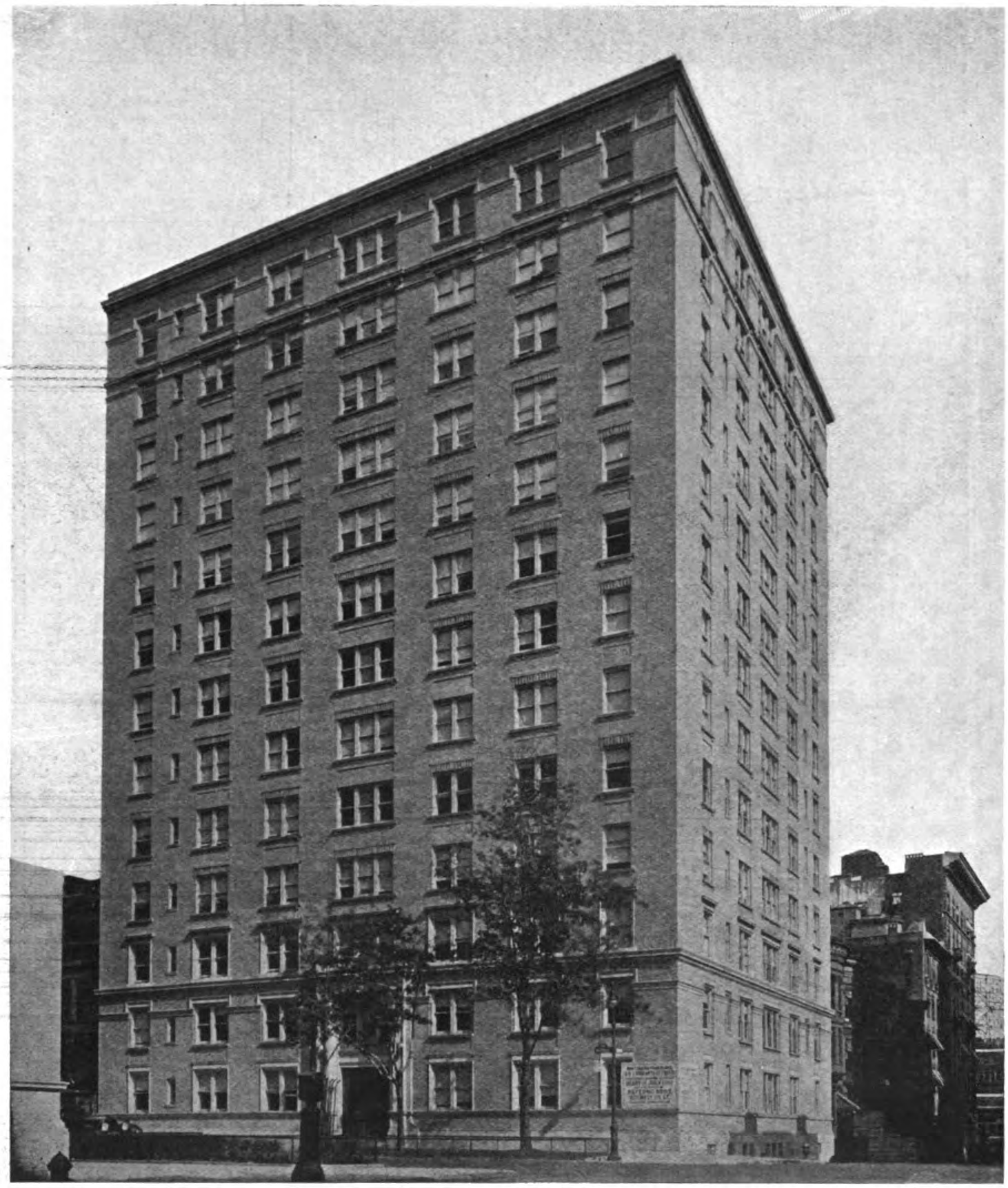
ARCHITECTURE AND BUILDING. Plate. 122.

Built by Samuel Larrivee; ornamental glass—Louis S. Jones; ornamental plaster H. W. Miller, Inc.; Frink reflectors used.


DETAIL OF DOORWAY, APARTMENT HOUSE, 103D STREET AND WEST END AVENUE, NEW YORK CITY.



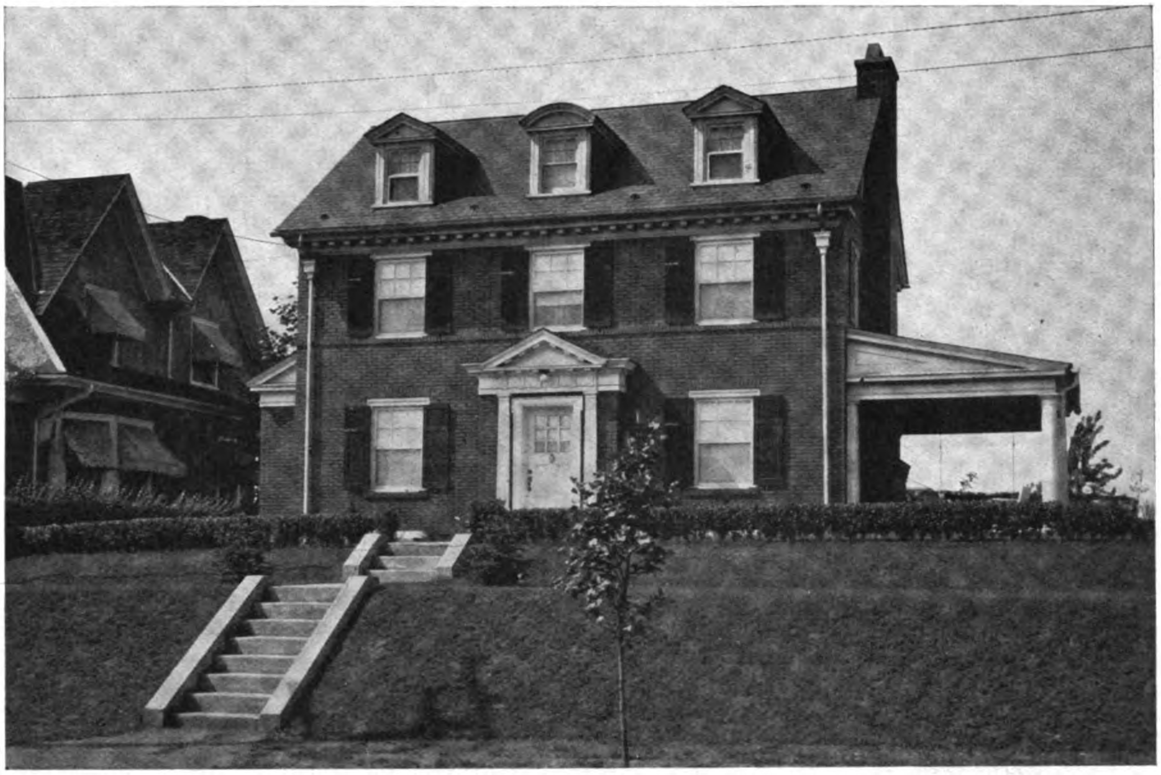
DETAIL OF DOORWAY, LYCOMING NATIONAL BANK, WILLIAMSPORT, PA.

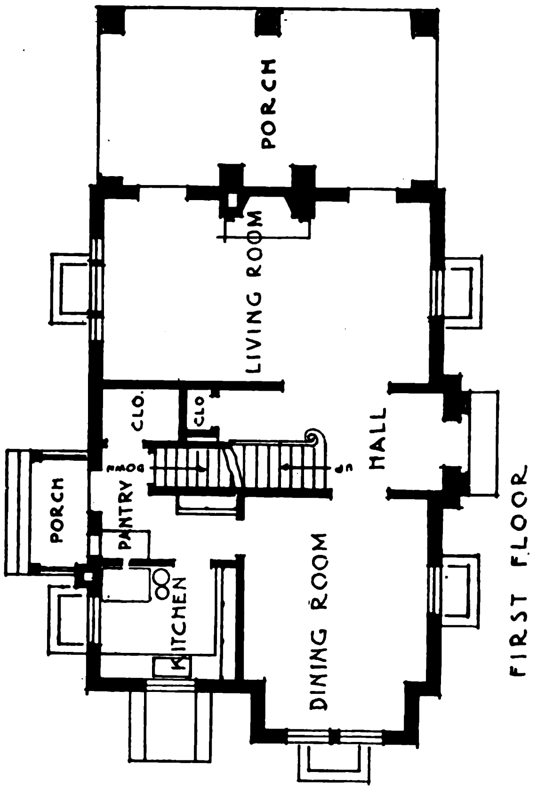


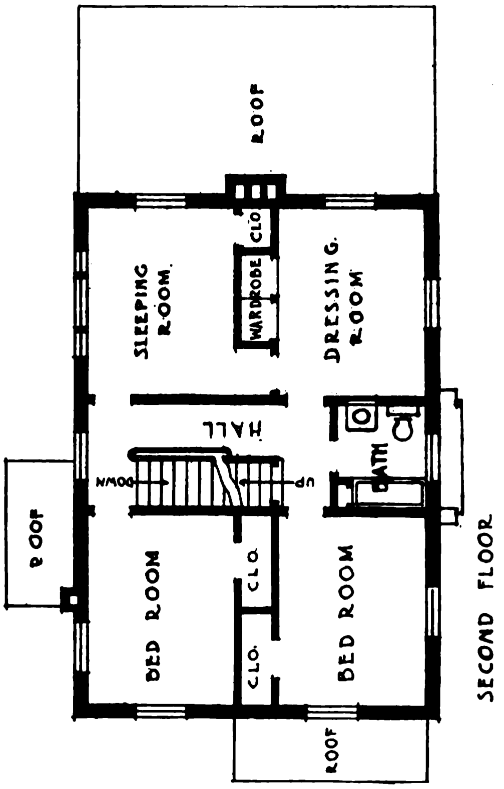
APARTMENT HOUSE, 103D STREET AND WEST END AVENUE, NEW YORK CITY.

Gaetan Ajello, Architect.

Architecture and Building. Plate 124.
Built by Paterno Bros.; lighting fixtures—Acme Lighting Fixture Company; flooring—Indiana Flooring Co.; sash and glass—Arnesto Glass Co.; paints made by Arnesto Paint Co.; fireproof doors—Brooklyn Fireproof Sash & Door Co., Inc.; elevator door equipment—Richards-Wilcox Mfg. Co.

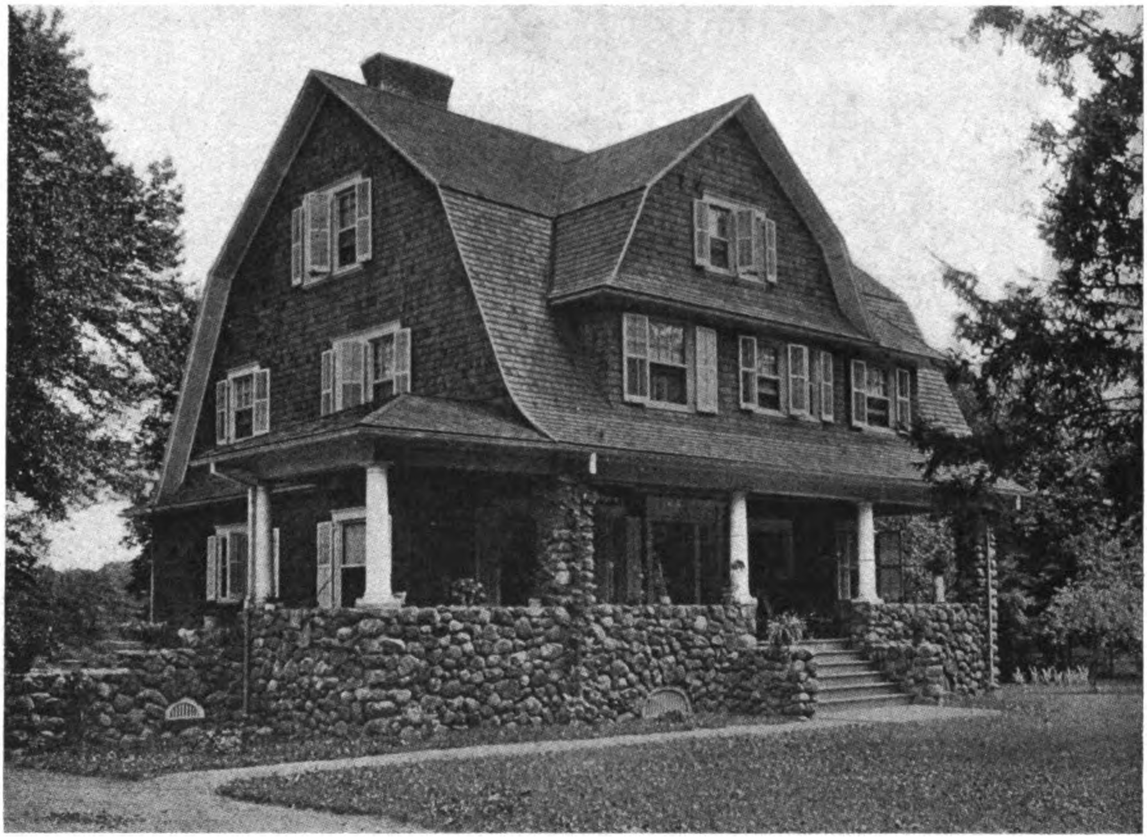


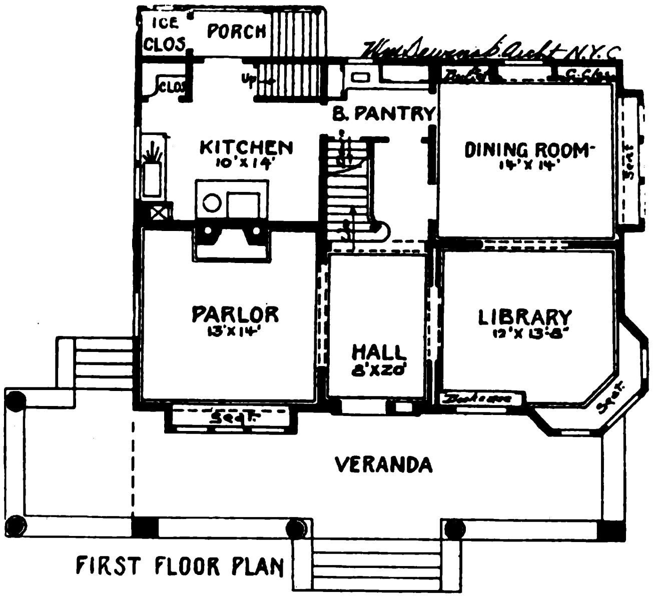




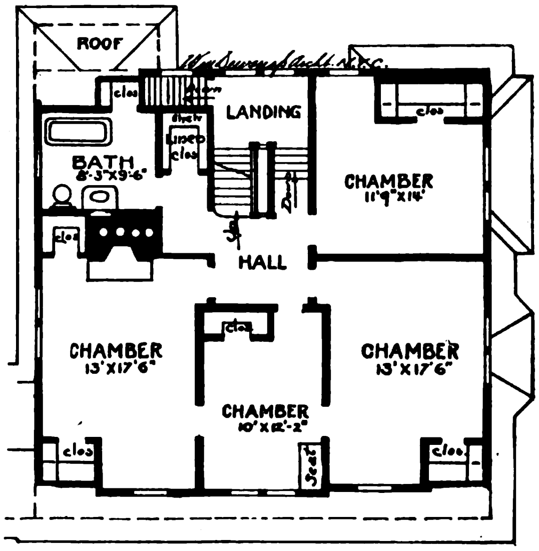
Note the sleeping and dressing rooms and wardrobe. The idea is to treat the sleeping room as a sleeping porch which can be heated during the day.

AN EIGHT-ROOM BRICK HOUSE.
C. E. Schermerhorn and Watson K. Phillips, Associate Architects.

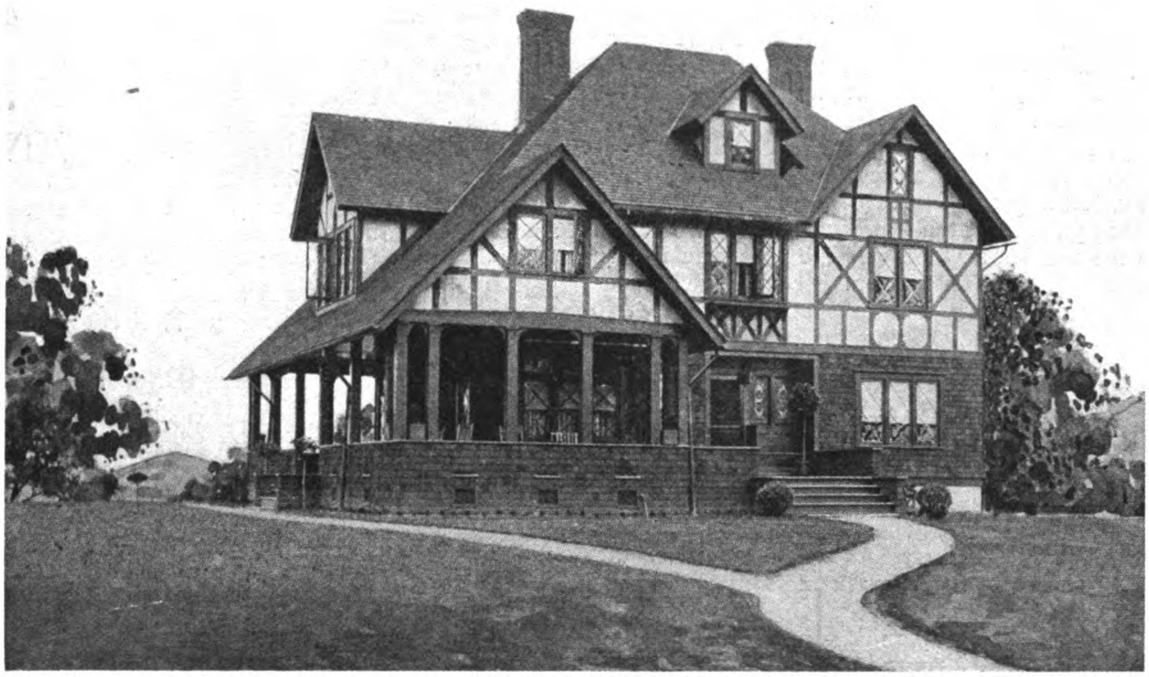


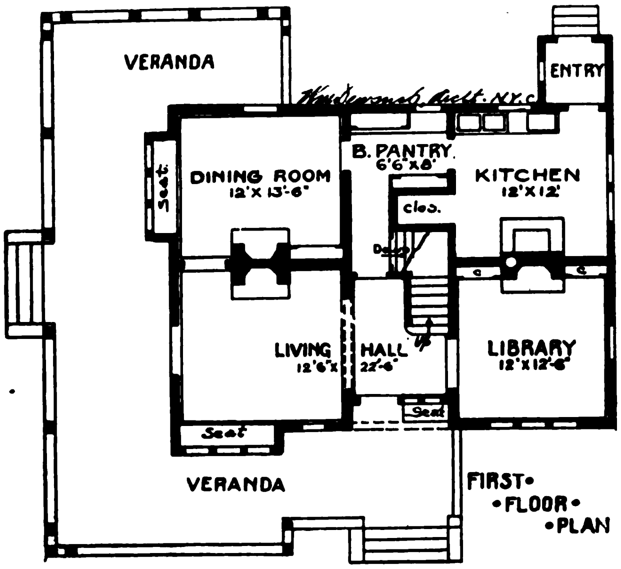


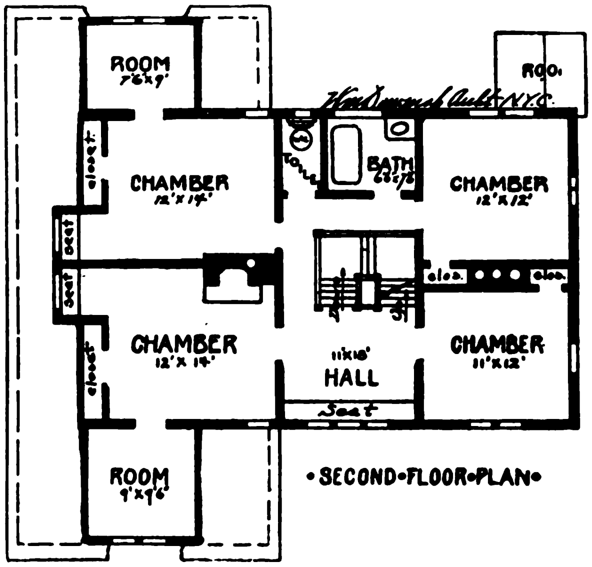
FIRST FLOOR PLAN



RESIDENCE AT ALLENDALE, N. J.
William Dewsnap, Architect







RESIDENCE AT ZANESVILLE, OHIO.
William Dewsnap, Architect.

the other for patients. All of the tables are enamel topped and the entire equipment is of the most sanitary type. A large reception hall with two adjoining offices complete the first story.

The second, third and fourth stories are given over to wards and private rooms. Each ward occupies one floor of a wing of the building and accommodates twenty-two beds. There are six of these wards in each story, as well as two wings divided into private rooms which are situated on both sides of a long hall extending the length of a wing. Roof gardens and sun parlors, refreshing with their palms and ferns, utilize the roof space. There is in the fourth story an additional dining room for those who, because of infirmities, are not able to make the trip downstairs to the main dining hall.

The fifth story is equipped as a hospital, and every up-to-date convenience is provided, such as an operating room, an anesthetic room, a sterilizing room, a doctor's office and a dental clinic.

Ventilation of the building is well taken care of. A special electric fan system has been installed with a "pull" fan which sucks in the fresh air, and a second fan which discharges the stale air. In this way the air is kept constantly moving throughout the building.

Three kitchens, one for milk, one for meat, and one for vegetables, are situated in the basement. Adjoining these kitchens there are a butcher shop, store rooms, a large refrigerator and a dining room for employees.

The laundry is equipped throughout with electrically operated apparatus. There are several large washing machines, wringers, irons and ironing machines. Adjoining the laundry are a linen room and and a clothes sterilizer. Opening into every dormitory there is a chute which carries soiled clothes direct to the laundry.

Baths and dressing rooms are in the basement. There are two rows of shower baths, seven showers in a row, with an elevated aisle between them. This enables the matron to walk up and down while baths are being taken and watch each patient. Rubber matting is spread on the floor of each shower to prevent slipping. Besides these showers there are baths for special hydrotherapeutic treatment.

All repair work is done right in the building, for several shops, among them a shoemaker's shop and a sewing room, are maintained. Many of the women spend their spare time in the sewing room repairing clothing and making new garments.

There are two passenger elevators and a freight elevator between the basement and first story only. There are about 2,500 electric lights and about 100 horse-power in motors, current for which is supplied by Edison service. The fire alarm system provides signal boxes on each floor and ample means of emergency escape from the building is provided by exterior fire stairs.

Mr. Louis Allen Abramson is the architect and G. Richard Davis & Company are the builders. The Shatz Painting Co., Inc., did the painting. The mason work was done by George Colon & Company and the cut cast stone work was executed by the Benedict Stone Corporation. The elevator door equipment was supplied by Richards-Wilcox Mfg. Co.

THE LYCOMING NATIONAL BANK.

To remodel a building is always a problem and to do it successfully is akin to genius. Creative genius can make the air castle a reality, but remodeling a building is much like making a silk purse out of a sow's ear. The old bank building of the Lycoming National at Williamsport, Pa., was that type which was prevalent a few decades ago when the brownstone front was the fashionable thing. In fact, it was a brownstone front, and still is for that matter, but no longer in harmony with its natal conception as to design and treatment.

The old building was but fifty feet deep. The first floor has been extended another fifty feet, and it is in this extension that the vaults, directors' room, etc., have been placed.

The old banking room was but one story in height, the two upper stories of the building being divided into offices. The offices have been done away with, and the first and second stories have been thrown into one, making the new banking room two full stories in height. The top story will be used for storage and space for future expansion of the bank's clerical forces.

The hallway and stairs formerly necessary to obtain entrance to the upper floors have been removed and the space included in the banking room.

An ornamental iron architrave and entrance designed in harmony with the original brownstone front forms an agreeable façade to the building, completely changing the aspect of the elevation.

The remodeled interior follows present requirements for a banking room, spaciousness, height and even lighting. The walls are flanked on either side with alternate Ionic pilasters and panels, with an elaborate Ionic entablature, forming the cornice, behind which are concealed the invisible lighting units. There are large circular windows at either end. The ceiling is a barrel arch, springing from the cornice ornamented in low relief with coffers.

The counters as well as the walls are Cardiff gray marble, with the upper structure of the banking screen of light bronze. At the end of the public space an ornamental bronze door encloses the safe deposit vault. The eight-inch vault door is protected with a triple time lock, and the vaults themselves are of concrete, eighteen inches thick, reinforced with chrome steel bars. A feature of the door is that it is protected against burglary by either the electric arc or oxyacetylene torch method of breaking into a vault. Inside of the main safe deposit vault is a special recess protected with a grill grate, in which are additional chrome steel cash vaults for the bank's cash and negotiable securities.

The directors' room at the rear of the building is amply lighted through a ceiling sash with panel walls and ornamented cornice. A fireplace and a French mirror give a suggestion of French influence to the design.

The floors through the building are finished in quartered oak, with the exception of the public space, which is marble flooring.

H. W. Miller, Inc., did the plastering and the ornamental glass work was executed by Louis S. Jones. Frink reflectors are used for both the direct and indirect lighting.

ANOTHER TIFFIN SHOP.

The color scheme of the Tiffin Shop at 10 Cortlandt street, New York City, is very modern in its generous use of black. The floor is tiled in white, checked off with a pattern of black and gray. The walls are black to the level of the chair rail; above they are painted a dull old gold, decorated in panels with gay colored birds and garlands of flowers in the same soft hues which appear in the conventional border which defines the panels. The lighting effect is simple. Hanging bowls and side lights of translucent white glass shed a soft restful light.

In perfect harmony with the setting is the graceful black furniture. There are four rows of square tables, of a size to seat four guests comfortably. Through the glass which covers the tables, the black tops, bordered with gold stripes, make an effective background for white doilies and dishes. Black chairs bottomed in natural rush are ornamented, like the tables, with stripes of gold. Painted on the chair backs are baskets of spring flowers, a bit of decoration reminiscent of the old French periods. The flowers echo the colors in the garlands on the walls.

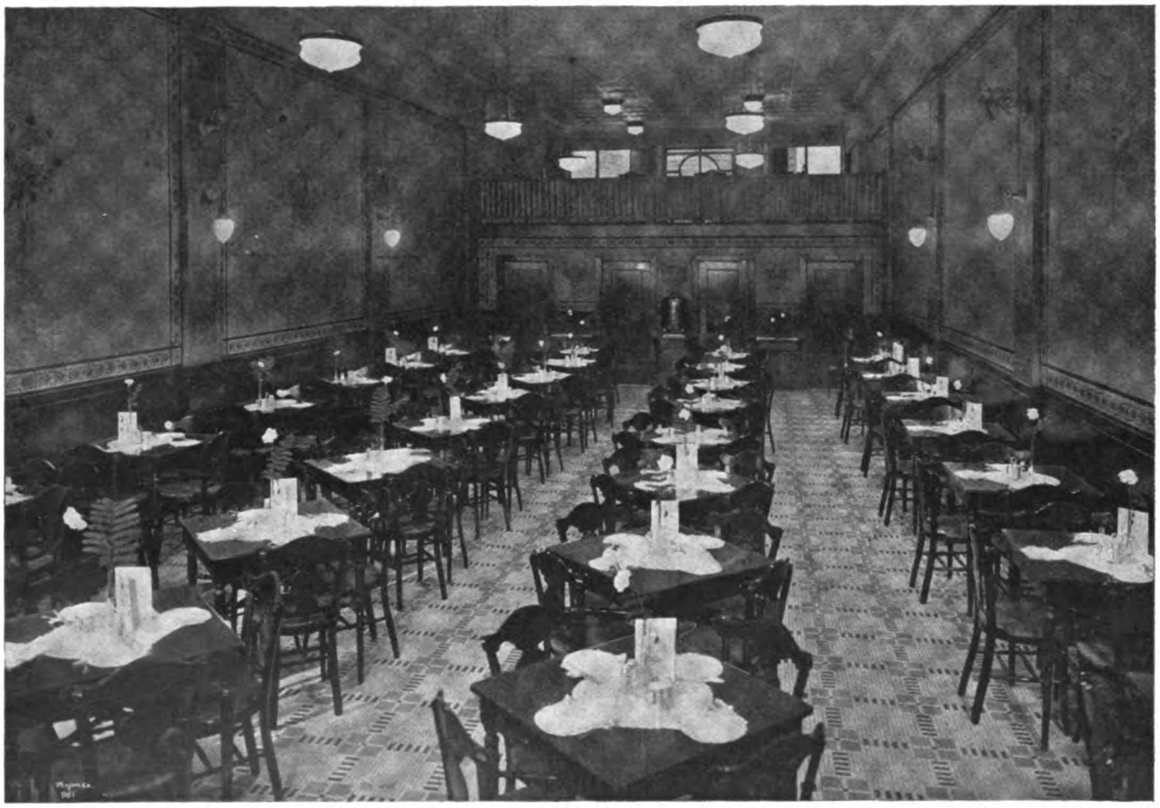
The chairs, while femininely dainty and graceful in design—as befits the atmosphere of a tea room—are substantially and carefully built. The tables are well balanced and solid. This furniture, which gives the Cortlandt Street Tiffin Shop such a flair of smartness will give, in addition, lasting service.

The chairs and tables were especially designed for the Tiffin Company by the Reischmann Company and are the same in all the Tiffin tea shops.

THE FOUNTAIN LUNCH ROOM AT 82 BROAD STREET

The rapid adaptation of the soda fountain lunch room to take the place of the saloon with its lunch counter is well shown in the new store opened by the Gem Fountain Corporation at 82 Broad street, in the midst of the curb market district. The store is run by a manager, who has under him a cashier, eight men and six women from eight o'clock in the morning, when the store is opened, until six o'clock in the afternoon, when it is closed. There are seats at tables for eighty-two, and these are generally occupied throughout the day by women. The men seem to prefer to stand and get their lunch served at the bar. The menu, changed daily, consists of a large variety of hot and cold sandwiches, several kinds of soups, fish, roast meats, a number of hot vegetables, cakes and different kinds of ice cream. This is in addition to soda and sundaes. The check system is used in serving so patrons do not have to buy their checks first. During the rush hour checks for less than twenty cents are not issued at the tables. The average check is for forty-four cents, including war tax, which is collected on all sodas, as the shop is rated as a soda fountain and not as a restaurant. The menus are placed under the glass tops of the tables, one for each seat, so patrons may see at a glance just what is offered for the day and what each item costs.

The fountain contains six stations with triple sinks and drain boards so arranged that the dispensers may give prompt service. The sections are connected by interlock joints so that it is possible to keep all the units clean. Each dispensing unit contains two milk pumps, three ice cream containers, fourteen syrup pumps and jars, two soda draught arms and two water draught arms. The cooler compartments are under the sliding drainers and there are duplex coolers under each draught arm section. This insures the soda being cold at all times. The back bar has four complete luncheonette units known as "Four-in-One" units. Each unit is equipped with a coffee urn and a chocolate urn. In addition there are two four-pot steam table sections and



TIFFIN SHOP, 10 CORTLANDT STREET, NEW YORK CITY.

Chairs and tables—Reischmann Co.

one warming oven with shelving. A hot water reservoir with water connections underneath serves these tables. Pink Tennessee marble is used and the pastry cabinets have plate glass shelving which is enclosed with plate glass, ball-bearing doors. They are illuminated with electric ray reflectors. All of the shelving both on the front and back bar, as well as the bars themselves, are rimmed with eighteen per cent. nickel silver.

The fountain is equipped with a mechanical refrigerating system which does away with the necessity for packing the fountain with ice. The system consists of a one-ton ethyl chloride refrigerating machine supplying coils in the ice cream and soda compartments so as to maintain the desired temperature in these compartments between any set limits. Across the top of the back bar is an electrically illuminated sign calling attention to the sandwiches and other delicacies served at the fountain.

The fountain installation in this lunch room was made by Braunstein Bros. Soda Fountain Co.

The exhibit of the New York Water Color Club will be postponed this year until such time as the galleries of the Fine Arts Building are rehabilitated. The fire which occurred early in the year with such destructive effect to the exhibit of the Architectural League necessitated extensive repairs to the building which have not yet been completed. A further announcement of the opening date of the New York Water Color Club will be made.

The Fifteenth Annual Exhibition of paintings by American artists at the City Art Museum, St. Louis, was held from September 15 to October 31, 1920. Many of the pictures in this exhibition are for sale and prices may be had upon application at the office of the secretary of the Museum.

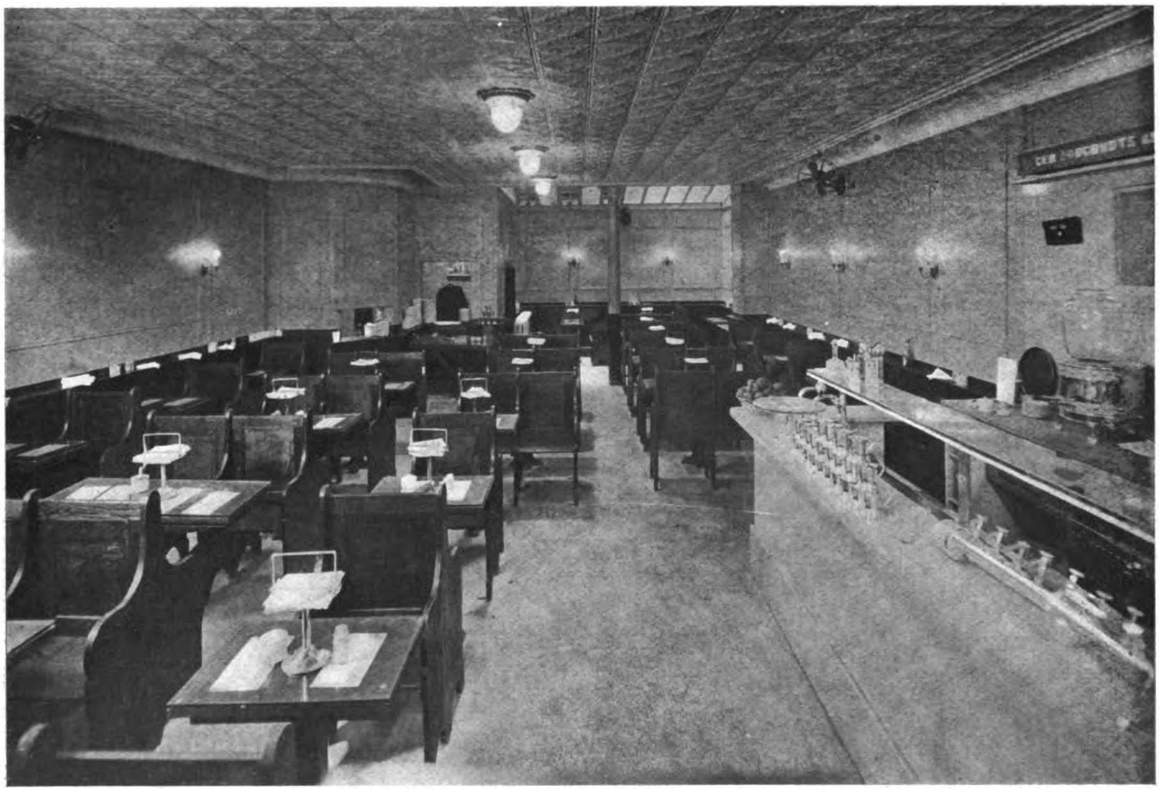
Book Reviews

AN EPITOME OF HYDROTHERAPY FOR PHYSICIANS, ARCHITECTS AND NURSES. By Simon Baruch, M.D., LL.D. Philadelphia and London: W. B. Saunders Company. 5½ x 8 inches. Cloth. $2 net.

The architect faced with the problem of designing a hospital has a diversity of problems confronting him which for the most part are familiar to his experience or at least easily found in the usual shelf full of reference books. The design of a hospital is, moreover, influenced for the most part by very definite ideas on the part of the client. The building committee, generally advised by competent physicians, has quite clear ideas of what is wanted and the architect meets his problem well toward a definite solution. On specialties, however, the architect is not in a position as a rule to be well informed, and frequently his building committee is looking for further advice on some such subject and puts it up to the architect. It is here that a treatise, on a specialty, is worth many times its cost, especially if written by an authority.

Dr. Simon Baruch, with his extensive knowledge of the subject of hydrotherapy, has written a book which deals with the principles and technic of the subject, but he lays stress on the fact that faulty installation of apparatus is often a cause for failure in treatment. To remedy this serious handicap, the author has written a chapter on "Hydrotherapeutic Instalments." Correct plans of existing institutions which have been in successful operation are pre-

(Continued on page 20—Adv.)



FOUNTAIN LUNCH ROOM OPERATED BY GEM FOUNTAIN CO., 82 BROAD STREET, NEW YORK CITY.

Fountain equipment—Braunstein Bros. Soda Fountain Co.

The REISCHMANN Co.

14-16-18 EAST 32ND ST. NEW YORK

LEADING MANUFACTURERS OF RESTAURANT FURNITURE

Illustration showing Tiffin Tea Room
Installed by The Reischmann Co.

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Many of the most magnificent hotels, the smartest tea rooms, the most exclusive clubs, the largest lunch rooms, are equipped with Reischmann Furniture. For over 50 years we have specialized in the manufacture of furniture for restaurants. Our success as specialists is evidenced by the quality of our patrons.

A Few Users of
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Hotel Monroe
Monticello Hotel
Tiffin Tea Rooms
Huylers
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Book Reviews

(Continued from page 92—Text)

sented, and defects, gathered from actual observation, are briefly stated to serve architects as guides in the future. The illustrations consist of views of various pieces of apparatus and details of some of them, such as the douche table. Plans of several complete successful installations are also given which are most valuable in giving good arrangement and an idea as to the space that must be allowed to such equipment.

OLD NEW ENGLAND HOUSES. By Albert G. Robinson. New York: Charles Scribner's Sons. 7 x 10 inches, 30 pages and 100 plates. Cloth. Price, $5 net.

The early inhabitants of New England built square and spaciously and had apparently great respect for clapboard and shingle. Their severity of spirit shows through their architecture and the substantiality of construction is really oppressive. There is no more warmth or welcome in their portals than there is in their east winds and long winters. The plainness of the buildings is relieved occasionally by good colonial details in doorways and cornices, but in general take the houses as a whole their chief recommendation is good proportions and the excellent roofs, often of the gambrel type with interesting dormer windows.

This book of Mr. Robinson's shows a long series of fine illustrations of New England houses which have an historical interest. One would expect the hardy New Englander to live in just such houses. He built his house the way he liked, reserved, useful and substantial.

The architectural designer will always find suggestions in such books. Nowadays even in New England we do not build so hardily, but there is great architectural merit in many of these old houses. They are vastly better and have a dignity utterly lacking in much modern work. The architect may well profit from a study of their proportion and hardheaded simplicity.

STRUCTURAL STEEL. Compiled and Published by R. A. Skelton and H. F. Bladen. London: R. A. Skelton & Co. New York: Isaac Pitman & Sons. 6½ x 8½ inches, 320 pages. Cloth. Price, $3.85 net.

This is a hand-book of structural steel shapes and rollings issued by a large English firm on the order of the handbooks issued by our great steel manufacturers in the United States. It is prepared in a very thorough manner and contains a large amount of data of use to the engineer. The method of reference by thumb tabs cut from the page edges is most handy. The large amount of tabulated data, the extensive use of charts and curves and many formulae given make the book extremely valuable. For the engineer who finds it necessary to familiarize himself with British standards of practice the book is valuable. Extensive conversion tables are included between the British and metric measures.

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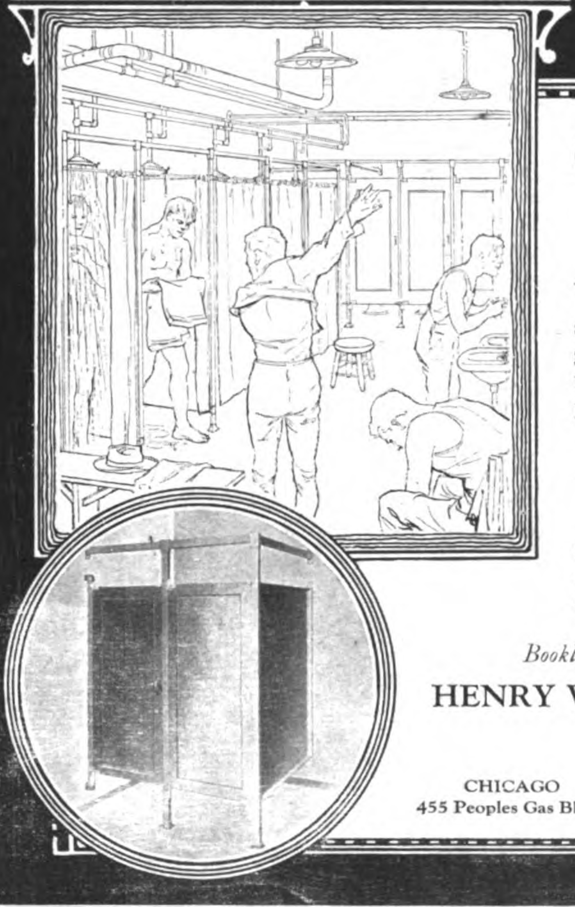

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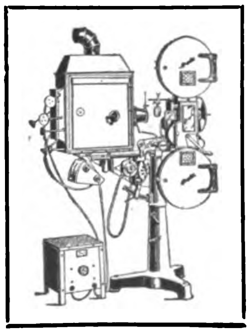

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Volume LII

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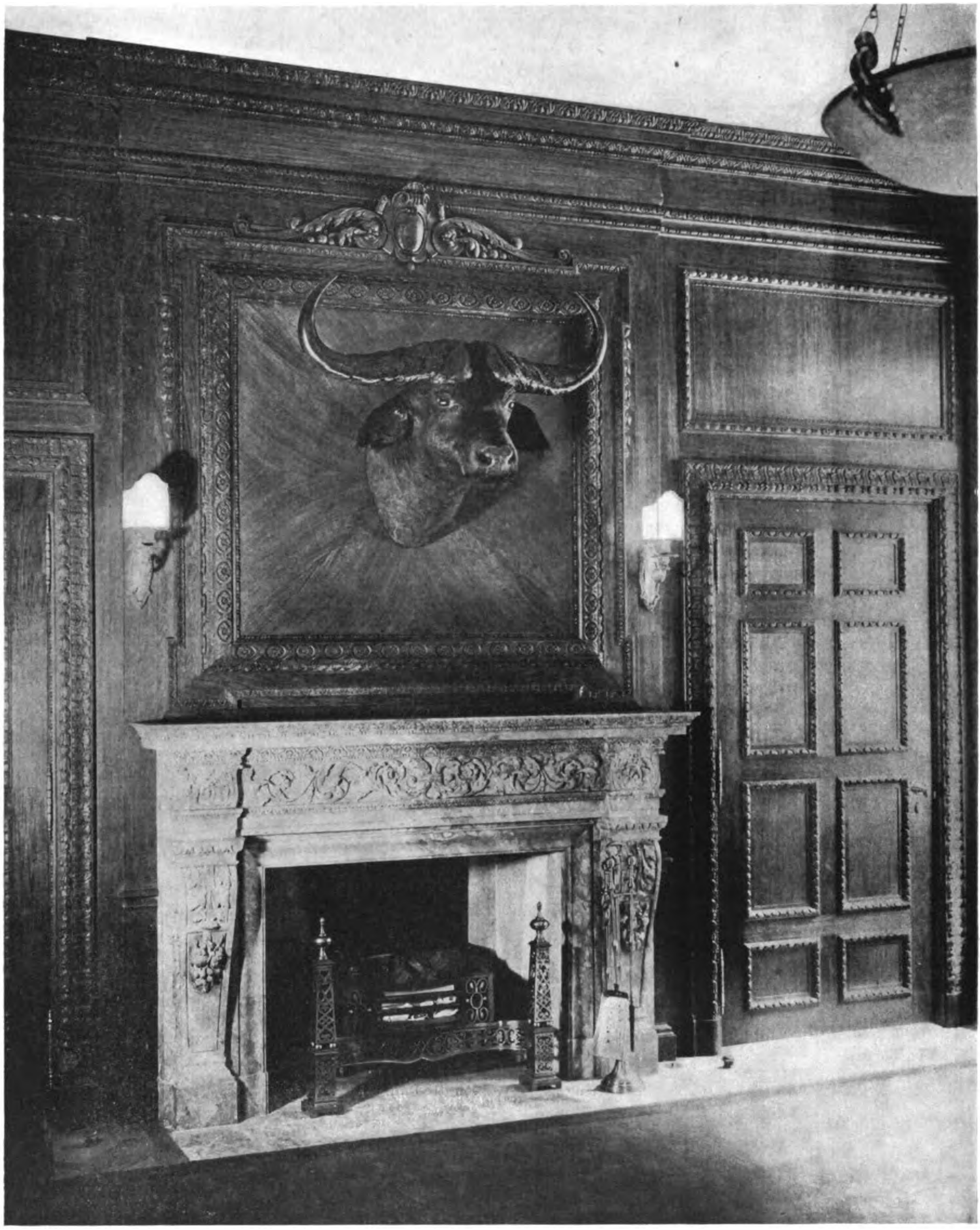

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ARCHITECTURE AND BUILDING

A Magazine Devoted to Contemporary Architectural Construction

WILLIAM P. COMSTOCK
Managing Editor

Volume LII NOVEMBER, 1920 Number 11

THE AUTOMOBILE MANUFACTURING PLANT OF THE STUDEBAKER CORPORATION AT SOUTH BEND, INDIANA.

In modern industry one of the tenets greatly stressed by the expert student of production is the relation of volume of production to cost. The greater the number of articles of one kind manufactured in a given period, a day, a month or a year, with a given equipment and working force the lower the cost of each article. This is the aim of all industrial engineers, to lower the cost of each article manufactured, maintain or better the quality and increase the production with given equipment to a maximum. Even a decade ago automobile production was numerically very small and many cars were hand fabricated step by step, each part being made and fitted and the completed machine being built up by a small force of mechanics who were familiar with every operation. Now this process is not only expensive, but it really does not produce as good an automobile as the modern factory quantity production method.

The Studebaker Corporation decided to erect the new plant for the production of their "light six" car in the summer of 1916 and arranged with James Stewart & Co., Inc., for its construction. The project provided for a plant which when completed would have an ultimate capacity of 500 cars per day, and which could be so built that approximately one-half of the plant could be finished originally to give about one-half of the maximum capacity without impairing the unit economy of production. Work on the construction was started in the spring of 1917, and during that year the first portion of the power house, part of the machine shop and part of the forge shop were completed. The entrance of the United States into the great war caused suspension of work in 1918, and building operation was not resumed until the spring of 1919. Since that date the plant has been brought to the point of approximately 50 per cent. of completion as originally projected. The buildings so far constructed involve an investment of about ten million dollars and the mechanical equipment installed in them a similar amount; a total of twenty million dollars.

Where it is possible, as in this case, to formulate a plan for a very large industrial development and within a very short period create it in tangible form there is an opportunity to concentrate the best engineering talent on its design and consider properly all of the factors which will make the plant a success. The Studebaker Corporation had very definite ideas as to the output they wanted and with this definite goal the engineering problem became one of exact calculation. Preliminary investigations were made both by construction engineers and production experts of the construction, equipment and methods of numerous modern plants throughout the United States and with this mass of data digested the planning of the new South Bend plant was started.

As a problem in design an industrial project is one of the proper routing and correlation of the different steps in the manufacturing process to secure the greatest economy. To this end careful time studies are necessary so as to avoid delays, rehandling, congestion or poor routing of the parts in the process of manufacture. In theory a properly laid out factory should operate as directly and as continuously as a belt conveyor. The development of the manufacturing process with all its mechanical equipment was the problem of the mechanical engineers and production experts. They determined just how many drop forgings had to be made a day and how many drop hammers it was necessary to have to produce them. To take care of the product of these hammers a certain number of finishing machines were necessary. So on throughout the entire process of manufacture the machine tool layout was studied so that each section and department functioned to capacity, each doing its part in the process and forming a link in the chain of progress which started with the raw material at the factory receiving room and ended in the warehouse for finished cars. These engineers working out the manufacturing process determined how all the varied operations fitted together; where it was best to have the forge shop, the machine shop or the assembly building so as to work to the best advantage. Not until all of this work was thoroughly designed were they ready for the construction engineer to build the roof over their heads.

Each large unit of the production process required a certain type of building to give the best results and herein

THE STUDEBAKER CORPORATION PLANT No 2 SOUTH BEND, IND
NEW MODERN AUTOMOBILE PLANT

PERSPECTIVE OF NEW SOUTH BEND PLANT OF THE STUDEBAKER CORPORATION.

entered another very important factor in modern production economy—the best working conditions for the employes and provision for employes welfare and comfort. This problem was studied with equal care both from the purely economic standpoint of its influence on production and from its humanitarian aspect. The extent of this work will be detailed later, but the physical provision for it was one of the problems of the construction engineers.

The general plan presented shows the grouping of the buildings and the relation of the portions so far constructed as well as the location and relation of the projected portions. The plant as 50 per cent. completed is as efficient per unit of production as it will be when entirely built. The enlargement of the buildings will increase capacity in direct proportion. The power plant is set out from the main group and is connected to all of the main buildings by a service tunnel which gives a flexible distribution to all of the building units. The four story finished stock and sub-assembly building is the center of the group. Parallel with it on one side is the one story machine shop and on the other side turned at ninety degrees so as to be end on are the assembly building, sheet metal stock and press rooms, forge and heat treating shop and the sites of the spring carbonizing shop and foundry. At the end of the group again parallel with the sub-assembly building is the site of the car storage and shipping building. The roadways and trackage facilities are adequate, connecting all buildings and within the structure material handling is done by overhead traveling cranes.

The power house embraces a boiler room, pump room, compressor room, coal handling tower and an ash handling building. Two of the four brick chimneys are erected, being 10 ft. inside diameter and 200 ft. high. The contents at present is 894,376 cubic feet with a floor area of 26,826 square feet and when completed will be 1,488,824 cubic feet and 44,262 square feet. The central portion of the building is 83 feet 6 inches high and the side bays 57 feet 9 inches high.

The machine shop, one story high, averaging 19 feet over the flat roof portions and 24 feet over the saw tooth portions is 427 feet wide by 578 feet long to be increased later to 1,136 feet long. It now contains 5,666,300 cubic feet of space with a floor area of 250,800 square feet and when complete will have 11,137,500 cubic feet and 494,000 square feet.

The finished stock and sub-assembly building, with four stories is 61 feet high in the main portion and 80 feet over the central bay. It is 193 feet wide and 528 feet long, to be later extended to 961 feet long. It contains 7,407,884 cubic feet of contents and 372,096 square feet of floor area, later to be increased to 13,381,619 cubic feet and 671,526 square feet. There is one service tower 20 feet by 62 feet 9 inches and five 20 feet by 51 feet 9 inches, all 77 feet high. Four more such towers will be added to complete the structure.

The assembly building, with four stories is of similar dimensions and construction to the sub-assembly building and of approximately the same area completed at present. When finished its area will be slightly larger. It now has six of the typical service towers and will have ten when complete.

The sheet metal stock and press room is of one story 44 feet 6 inches high in the central bay, 30 feet 6 inches high in the side bays and 25 feet high in the inspection aisle adjoining the assembly building. Its complete ground area and portion completed is about the same as the assembly building and it now has 3,164,170 cubic feet of contents and 103,179 square feet of floor area to be later increased to 6,051,690 cubic feet and 196,250 square feet.

The forge and heat treating shop, one story building is 41 feet high with a height of 33 feet in the saw tooth portions. It is 160 feet 6 inches wide by 741 feet 6 inches long, later to be 1,098 feet 6 inches long. Its contents is 4,487,426 cubic feet with 141,427 square feet of floor area and when complete is to have 6,651,570 cubic feet with 230,779 square feet of floor area.

The approximate ground areas of the spring carbonizing shop, foundry and car storage building may be judged from the plan. The plant when completed will cover eighty-five acres and the cubic contents of all the buildings now completed is 29,018,856 cubic feet and the floor area is 1,266,124 square feet. When entirely finished the cubic contents will be about 63 million cubic feet and the floor area about 2,700,000 square feet or roughly a square mile.

The following tabulation gives a quantitative idea of the extent of the construction work which was in part structural steel and in part reinforced concrete:

Cement	180,000	barrels
Sand	55,000	cubic yards
Gravel and stone	85,000	" "
Lumber	7,000,000	feet board measure
Brick	5,000,000	
Reinforcing steel	4,500	tons
Structural steel	6,600	"
Steel sidewall sash	201,000	square feet
Steel saw tooth sash	115,700	" "
Solid cement roof tile	516,800	" "
Glass roof tile	48,600	" "
Creosoted wood block floors	405,100	" "
Asphalt block floors	262,500	" "
Cement floors	134,600	" "
Maple floors	101,300	" "
Marbleloid composition floors and wainscoating	163,000	" "
Iron shaving floors	100,900	" "
Brick block floors	11,300	" "
Glass double strength	160,000	" "
Glass ¼" rough wire	155,000	" "
Steel sliding doors	25,200	" "
Hollow tile partitions	180,000	" "
Steel and glass partitions	16,200	" "
Corrugated iron siding	33,800	" "
Elevators, freight	12	
Elevators, passenger	4	
Maximum number of men employed in the construction work	2,000	

The power house connected with this new plant supplies service to the old plant as well. The service tunnels carry all the piping for steam for manufacturing and heating, hot and cold water and fire lines, compressed air and fuel oil. These tunnels are constructed to allow for future piping in accordance with plant extensions. Placed end to end the total length of the tunnels is over a mile with a tunnel width ranging from 13 feet to 5 feet 6 inches and height of 6 feet 6 inches.

The electrical energy for light and power comes from the Indiana Michigan Power Company to a sub-station adjoining the property at 23,000 volts—3 phase—60 cycle which is distributed to transformer banks on the roofs of the various buildings at 2,300 volts. The power distributed throughout the buildings is 440 volts, 3 phase, 60 cycle. The light is 240 volts, single phase, 60 cycle. The general illumination in the buildings is by Cooper-Hewitt lamps, both D.C. and A.C. design.

The power plant building is of steel construction, brick walls and designed for future extension both for boiler and generating equipment. The boilers are of the Heine high pressure type, set on a firing floor elevated above the ground to provide below for ash disposal, auxiliaries and condensing equipments. At present there are eight 525 B.H.P. boilers set in battery with central firing aisle. The present building can accommodate four more boilers and when the building extension is added eight more boilers can be installed, making a total of twenty boilers having a normal rating of 10,500 B.H.P. The present boilers have high settings, superheaters and Taylor underfeed stokers. They are operated with considerable overrating. The coal is received by railroad hopper car delivery and elevated by bucket conveyor discharging on to a belt conveyor, of the Palmer-Bee Co. manufacture which delivers the coal to an overhead bunker. An electrically operated coal lorry as made by the Beaumont Company weighs and delivers the coal to the stoker hoppers. The ashes from ash hoppers fall by gravity into industrial cars operated on track in central ash aisle directly under the firing floor. These cars are carried to an electrically operated balanced skip hoist which raises these ashes to an overhead bunker ready for discharge into railroad car or trucks. There are at present two Eureka continuous water softening plants with future provision for two more, making four plants in all when power house is fully completed.

At present there is no generating plant, space, however, for housing this equipment is provided for, as well as ground location for a spray pond acting as a fire protection storage reservoir. This pond is to be just to the east of power plant.

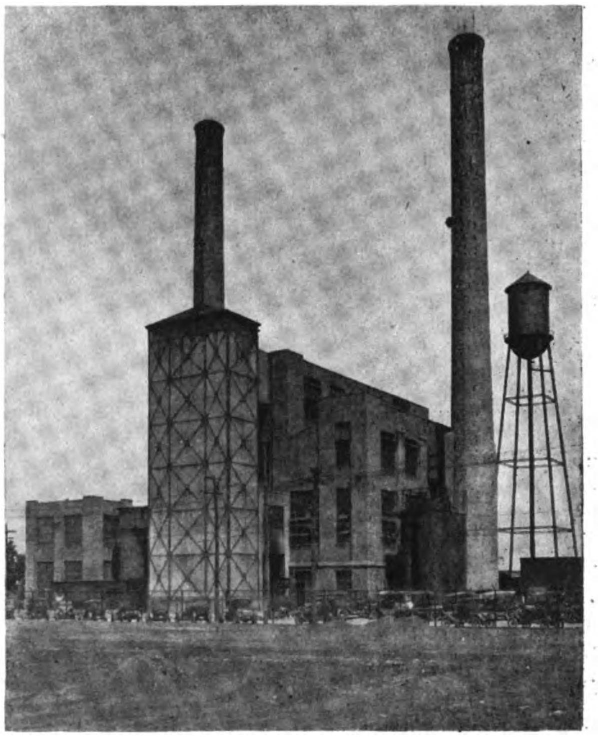
At present there are four large electrically operated Ingersoll-Rand air compressors located in and occupying a part of the compressor building contiguous to and part of the power plant. Air both for high and medium pressure uses is compressed and carried in piping in the underground tunnels to the buildings.

All the buildings are heated by low pressure steam obtained either from the exhaust of the many forge hammers or through reducing valves from the medium pressure steam line, both supplies coming from the piping in the tunnels. The heating returns are pumped back to the power plant. Generally the heating is by wall coils and wall radiators with the large interior portions of the higher buildings heated and ventilated by motor driven fans on the roof with heated air carried therefrom in ducts on the roof and flues down the court columns.

All buildings are supplied with both cold and hot water pumped from the power plant through the tunnels. The water is drawn from the ground by means of motor driven vertical centrifugal pumps of the Hill Pump Co.'s make and their discharge forces this water to all plumbing fixtures and service uses throughout the buildings. The water to be heated is pumped through Alberger heaters operated with low pressure steam. This heated water is circulated by pumps to all buildings by supply and return piping in the tunnels.

To the west of the power plant there are large underground concrete oil tanks of large storage capacity. These tanks obtain their oil supply by railroad car delivery. The oil in tanks is heated by submerged pipe coils. The after heaters and pumps, as made by the Tate-Jones Co., heat and circulate this oil to all buildings wherein oil is used in furnaces.

There is a complete underground fire protection system. The water is obtained at present from the old storage reservoir and a large elevated storage tank, but in the future the reservoir will be of one million gallons capacity located at the east of the power plant and used in conjunction with the fire protection system as a spray pond. In the power plant there will be located the large steam driven fire pumps which will draw the water from the storage reservoir and pump it into the underground mains. These underground mains supply water to the fire hydrants, hose stand pipe equipments and all the sprinkler systems.



THE BOILER HOUSE.

The elevators are of heavy duty design with electrically operated overhead machines made by the Haughton Elevator Company.

While the production engineers studied every phase of the mechanical development of the plant to gain the greatest efficiency in machine production there was another factor of equal importance to the success of the enterprise which was also extensively studied. Where so large a number of men are employed, estimated at from nine to ten thousand when in full operation, an economic study of the working conditions from their point of influence on the workman as a human machine was as necessary. The basic theory is that the better the working conditions and the more comfortable and satisfied the workman the greater is his individual capacity for production. The less the obstacles which he has to overcome to do his work the more he will produce. Moreover if there is an incentive to work such as an increased return for greater production there is less waste of effort and time and competitive spirit is aroused between individuals and departments. Proficiency in many operations is acquired by practice and it takes time to develop that high degree of team work in crews to reach the pinacle of production. It is important to hold employes and reduce the turnover of the working force to the lowest figure for this reason.

To meet these conditions and effect them two methods were followed. First to make the surroundings in the factory as comfortable as possible and second to offer the employes a cooperative benefit. The spirit of the works is that of consideration for the employe and faith to the employer and the building of this begins with the hour when a man applies for a job and is given a personal private interview to ascertain his qualifications and where he will best fit in the organization.

Throughout the plant good working conditions exist.

There is proper lighting, good ventilation, sufficient heat and adequate working space. Safety devices of every necessary character are provided. In such difficult conditions as are imposed in a forge shop good results even have been obtained. There is no oppressive feeling from terrific heat and smoke. The men work in comfort, for the heating is all done from above and kept away from them. The aisles are kept clear of hot forging and safety and comfort exists.

Each working unit and each story of every building is provided with lavatories, cafeteria and rest rooms and there are shower baths and locker rooms. Where there are women workers they are separately provided for. The cafeteria have tables and chairs so that home lunches may be eaten in comfort or food may be purchased from the counters.

The co-operative plans of The Studebaker Corporation comprise five divisions: The Anniversary check plan; the co-partnership plan; the vacation plan; the pension and life insurance plans and general plans.

The employe who meets the conditions of continuous service, in which a thirty-day allowance is made each year for sickness, leave of absence or vacations, is entitled each year to a five per cent. bonus on his yearly earnings in the form of an anniversary check up to the fifth year after which he will receive ten per cent.

The co-partnership plan, open to all employes who have served thirty days affords them the opportunity of purchasing common or preferred stock of the corporation at 50 per cent. of its cash price, paying for it in four years.

The vacation plan gives one weeks' vacation with pay to continuous service employes who have worked for the corporation for two years or more and fulfilled the conditions.

The pension and life insurance plans provide pensions and life insurance to employes under certain conditions dependent on length of service and standing.

The general plans include an emergency hospital and recreation and amusement features such as club rooms, recreation parks and bands and athletic teams.

The idea of this work is to further the efficiency of industry and the directors of the corporation in announcing the plans above outlined frankly stated that they were intended to increase the number of continuous service employes and to eliminate so far as possible, the number of transient employes. Modern industry to meet competition must have full co-operation of all the factors involved.

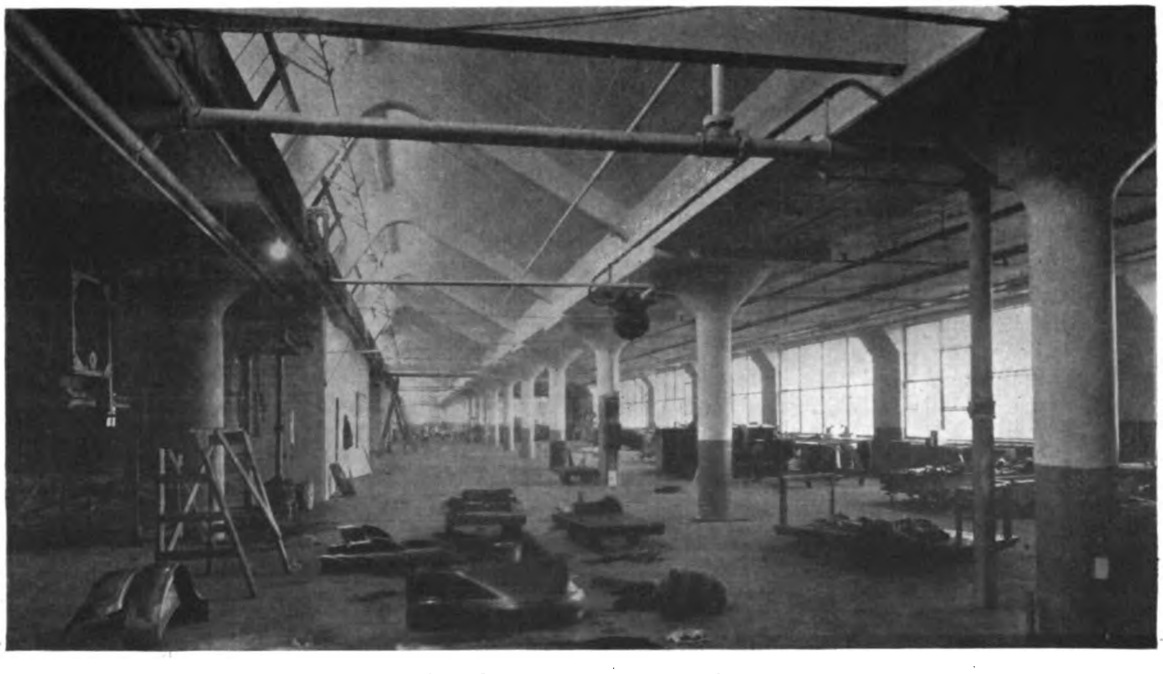
CONSTRUCTION NOTES

The general contractors for the plant were James Stewart & Co., Inc. Clyde R. Place was the consulting engineer for the contractors on the mechanical installation. The engineering firm of Robert W. Hunt & Co. made the inspections. The Faitoute Iron and Steel Company did the reinforcing steel work. Universal Portland cement was supplied by Staples-Hildebrand Co. Fitzgerald-Speer Company did the mill work and trim; the doors throughout are extra heavy metal covered to withstand hard wear and for fire protection, and were furnished by Betz Bros., Inc. William Horner supplied the maple flooring; The Marbleloid Co. laid the composition flooring and the Asphalt Block Pavement Co. laid the asphalt block surfaces. The Barrett Specification roofing, covering 380,000 square feet, was laid by John Beyrer.

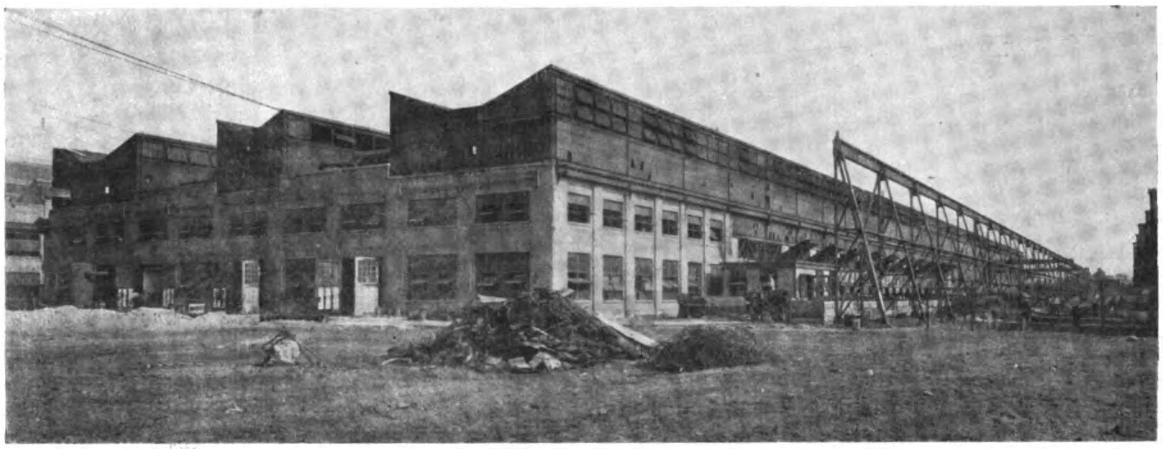
The Unitbilt glasteel partitions were supplied by The E. F. Hauserman Co. This firm also installed about 175,000 square feet of steel sash glazing in this plant.

H. Kelly & Co. did the heating and ventilating work and Charles M. Oberlin & Co. held the plumbing contract. The Reading Iron Company's wrought iron pipe was used and the hydraulic valves, fittings and piping were furnished and installed by the Pittsburgh Valve, Foundry and Construction Co. Windshield scuppers for floor drainage were used throughout, and the floor gratings were supplied by Mitchell-Tappen Co. The Weiss Manufacturing Co. furnished the metal doors used in all the toilet rooms.

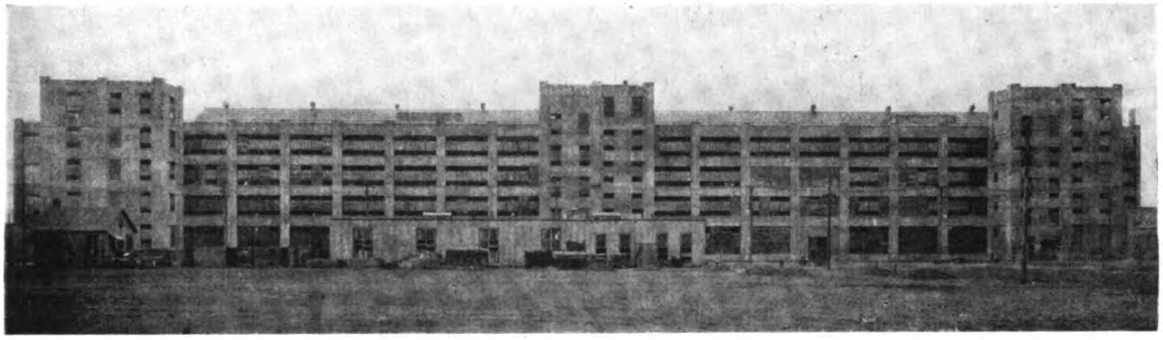
(Continued on page 99)



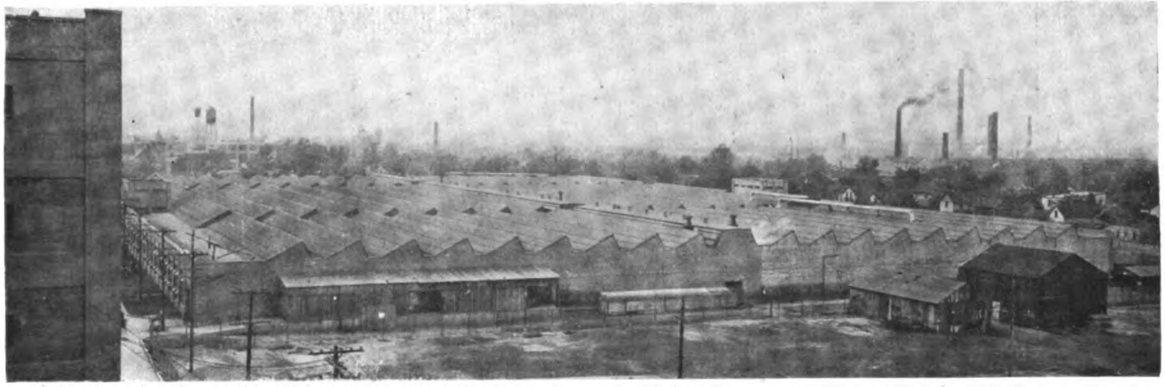
FOURTH FLOOR, SUB-ASSEMBLY BUILDING, SHOWING ROOF CONSTRUCTION.



FORGE AND HEAT TREATING SHOP



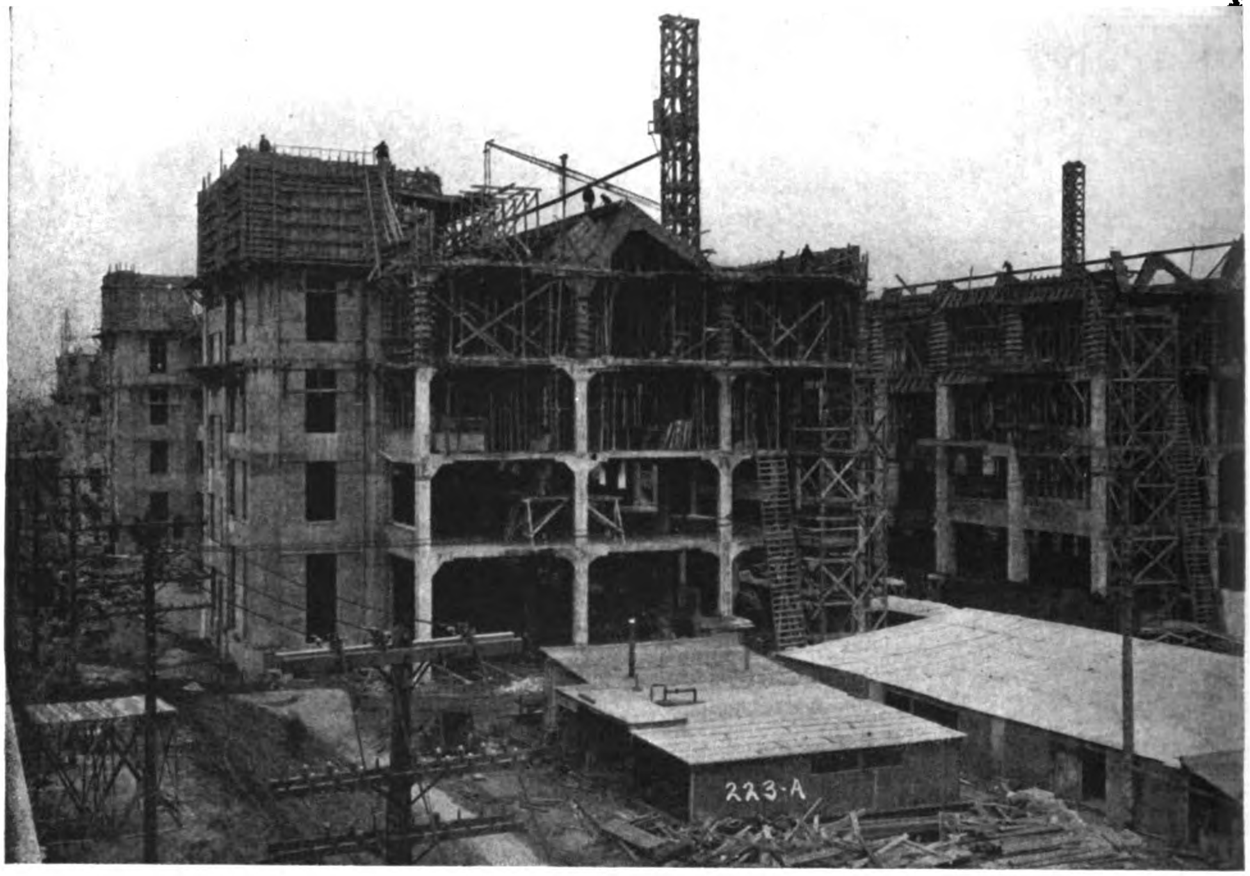
SUB-ASSEMBLY BUILDING



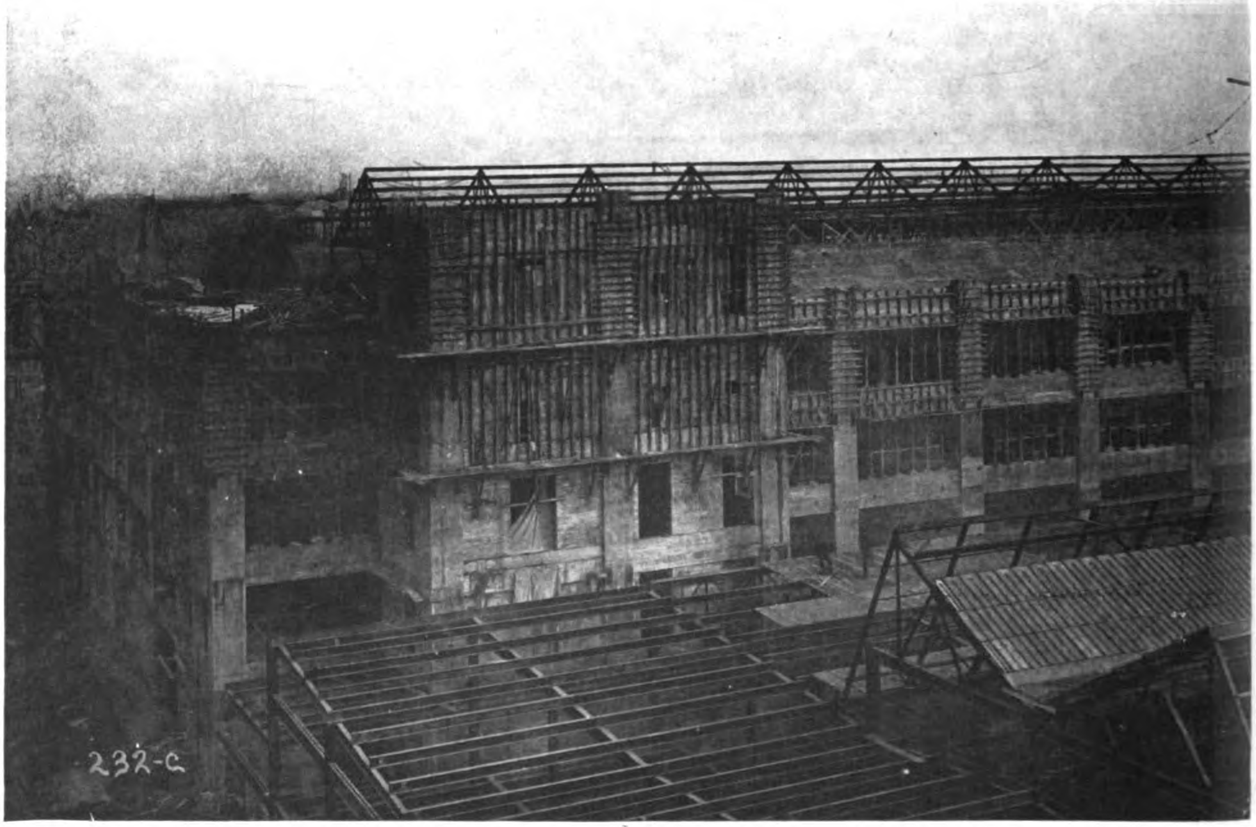
MACHINE SHOP, NEW SOUTH BEND PLANT OF THE STUDEBAKER CORPORATION.

James Stewart & Co., Engineers and General Contractors.

Consulting Engineer on the Mechanical Installation—Clyde R. Place; inspection engineers—Robert W. Hunt & Co.; maple flooring—William Horner; roofing—John Beyrer; Westinghouse—Krantz safety panel boards installed.

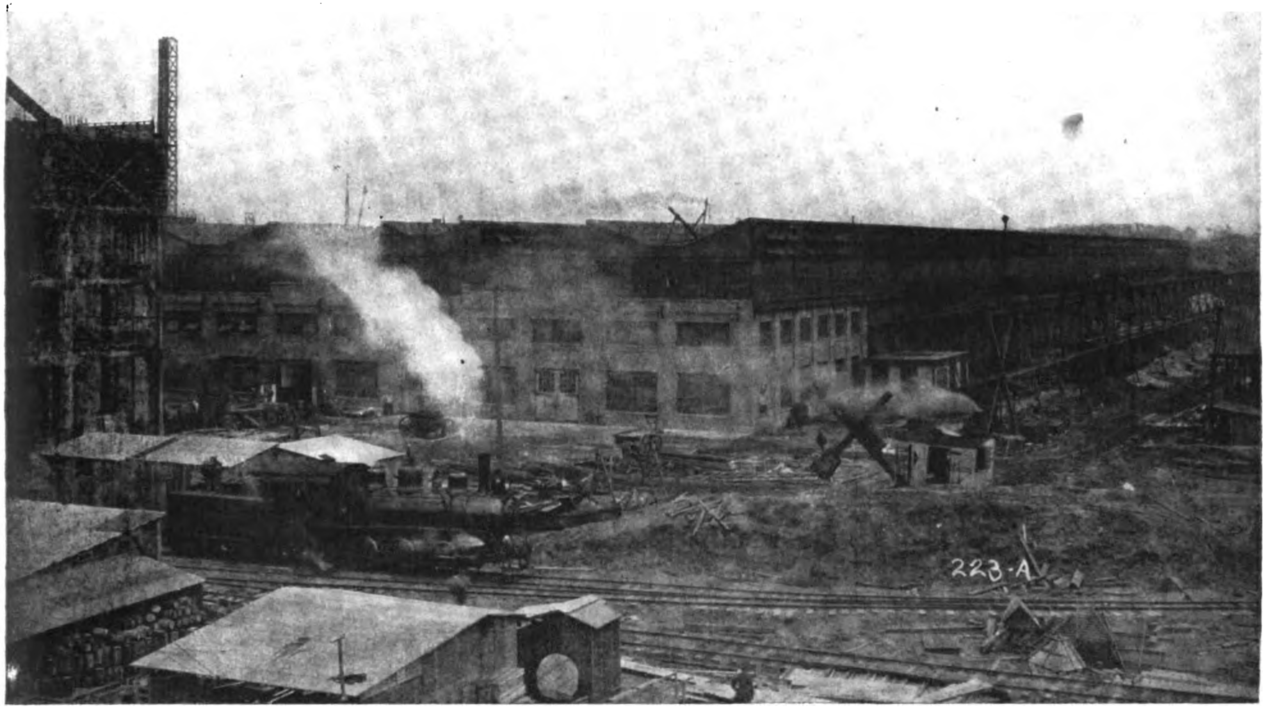


CONSTRUCTION VIEW OF SUB-ASSEMBLY BUILDING WITH

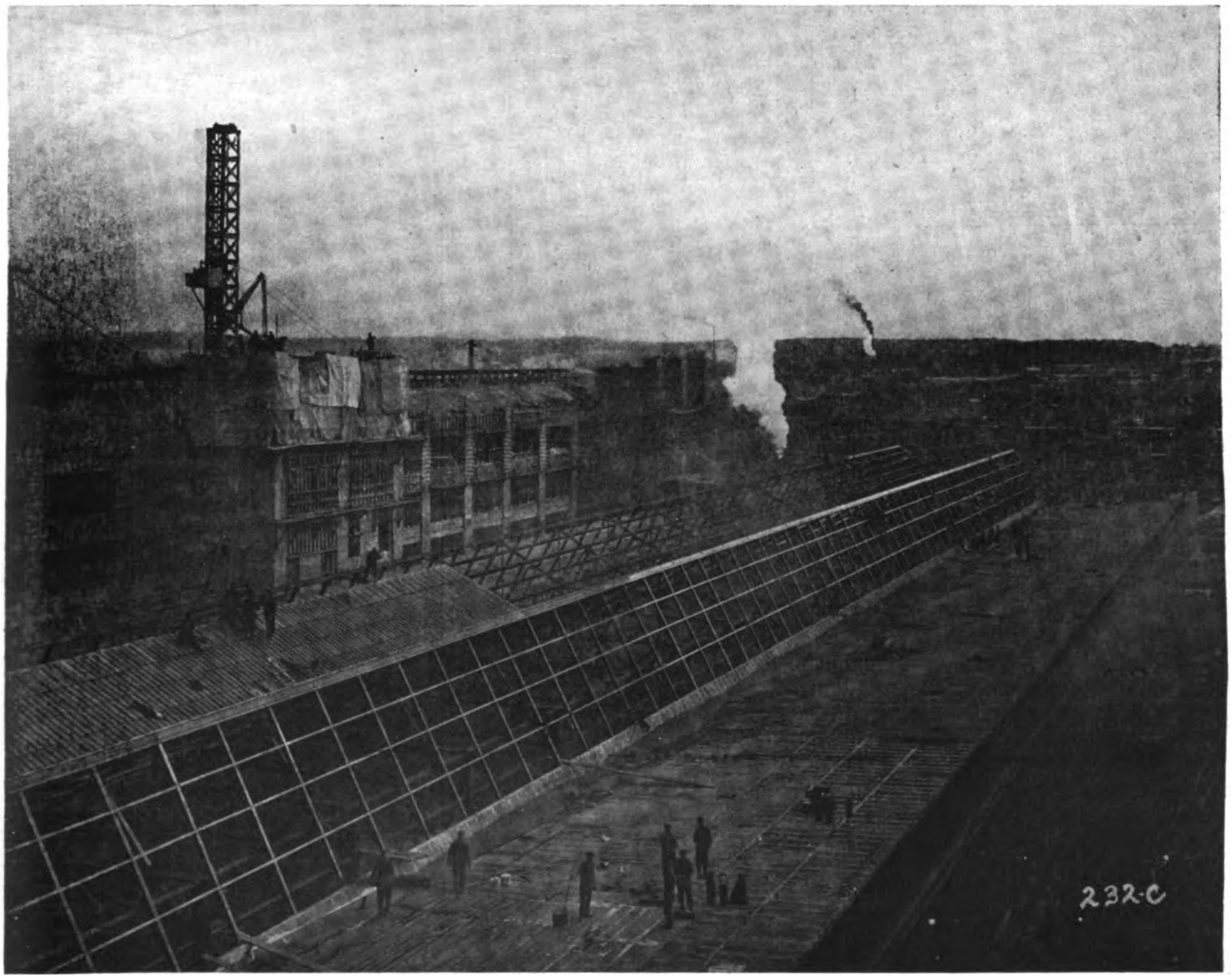


ARCHITECTURE AND BUILDING. Plate 126.

Structural and reinforcing steel—Faitoute Iron & Steel Co.; Universal Portland cement supplied by Staples-Hildebrand Company.

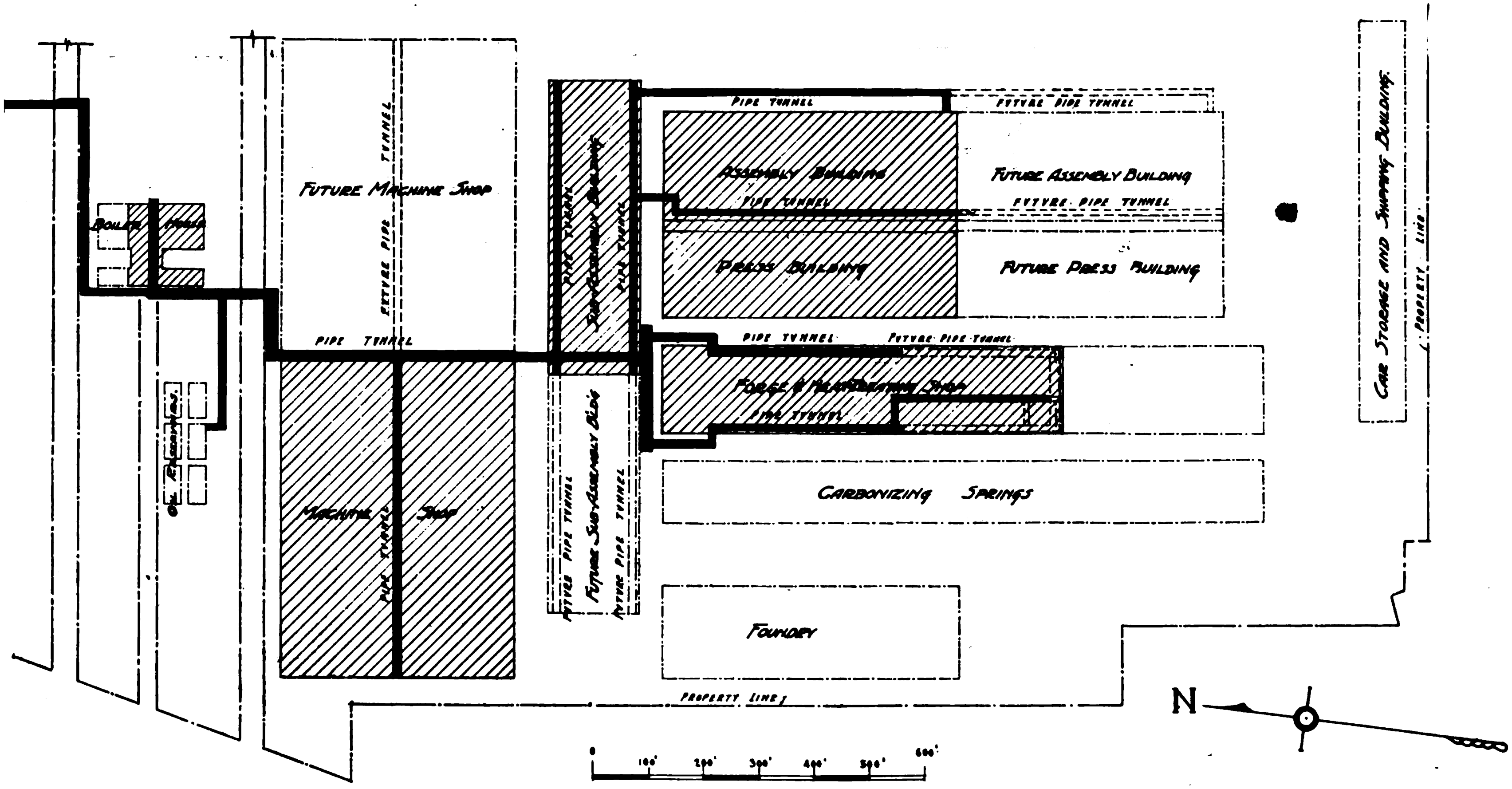


FORGE AND HEAT TREATING SHOP ON THE RIGHT.



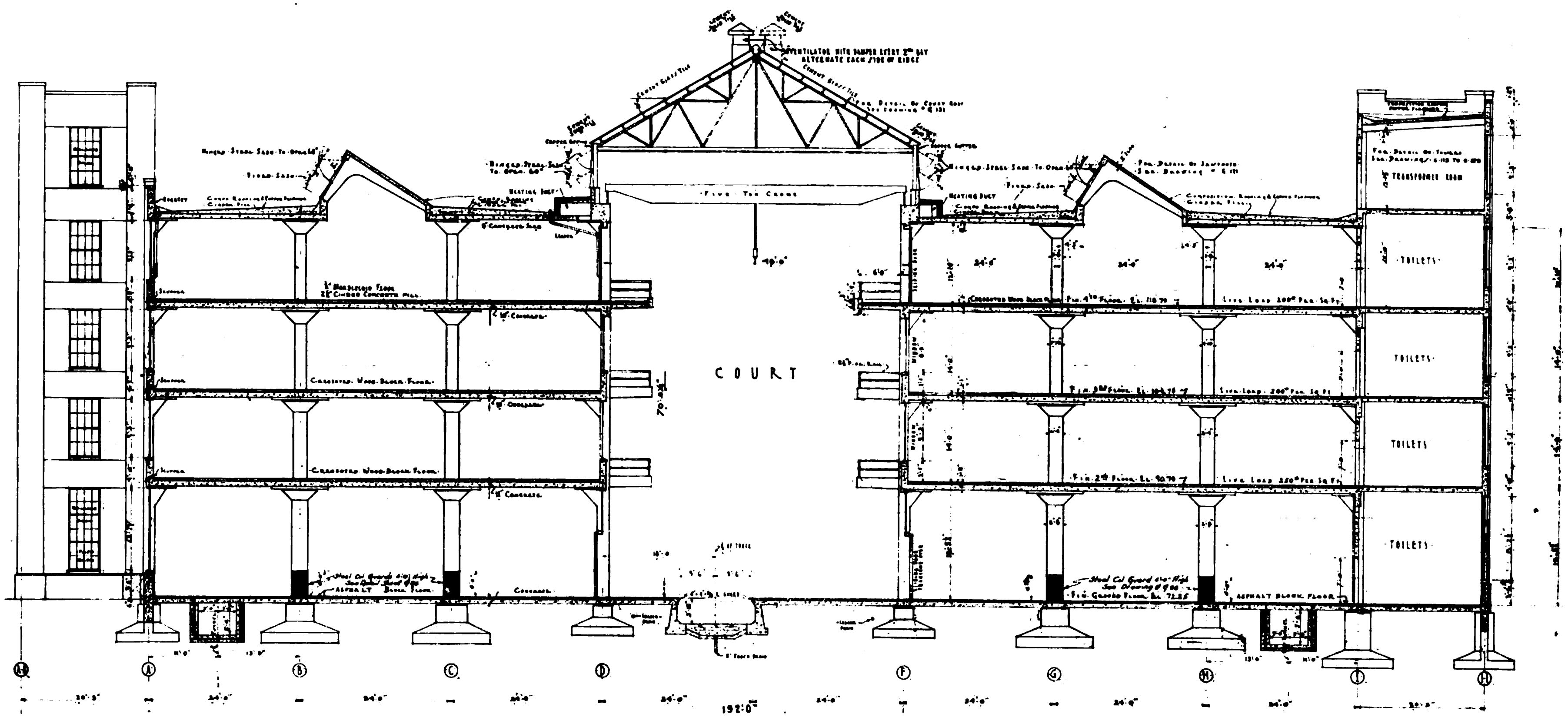
CONSTRUCTION VIEW OF PRESS BUILDING WITH MAIN ASSEMBLY BUILDING IN BACKGROUND, NEW SOUTH BEND PLANT OF THE STUDEBAKER CORPORATION.

James Stewart & Co., Engineers and General Contractors.



PLOT PLAN, NEW SOUTH BEND PLANT OF THE STUDEBAKER CORPORATION.

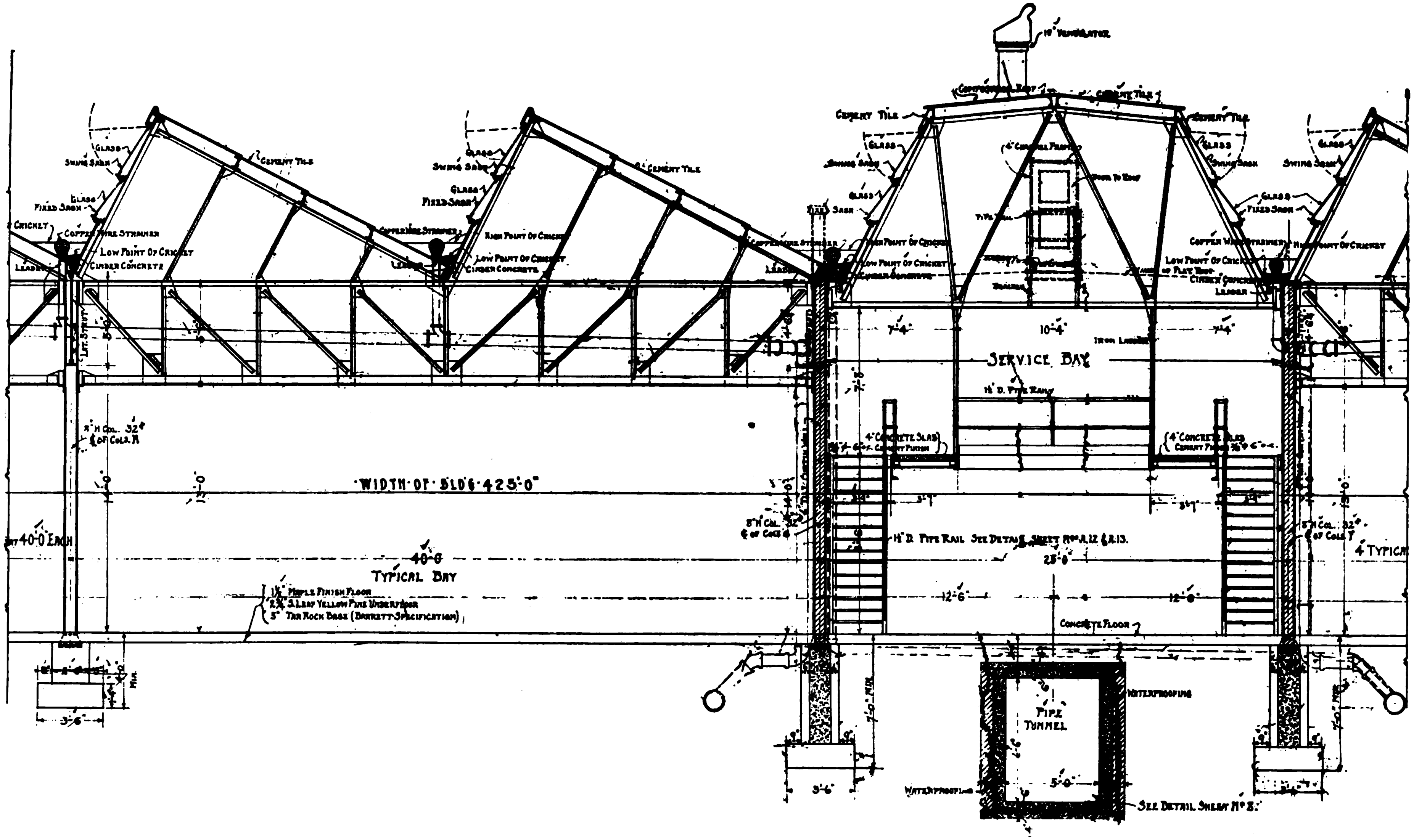
James Stewart & Co., Engineers and General Contractors.


VENTILATOR WITH DAMPER EVERY 2nd BAY ALTERNATE EACH SIDE OF RIDGE
Cement Glass Tile
For Details of Court Roof See Drawing # G 131
Copper Gutter
Hinged Steel Sash to Open 60°
Heating Duct
Five Ton Crane
49'-0"
COURT
70'-3¼"
Creosoted Wood Block Floor
Fin. 4th Floor. El. 118.70
Live Load 200# per Sq. Ft.
Fin. 3rd Floor. El. 104.70
Live Load 200# per Sq. Ft.
Fin. 2nd Floor. El. 90.70
Live Load 250# per Sq. Ft.
Steel Col Guard 4'-0" High See Drawing # G 90
Fin. Ground Floor. El. 72.25
Asphalt Block Floor
For Details of Sawtooth See Drawing # G 131
Composition Roofing & Copper Flashing
For Details of Towers See Drawings G 118 to G 120
Transformer Room
TOILETS
TOILETS
TOILETS
TOILETS
24'-0"
A
B
C
D
F
G
H
I
192'-0"

Architecture and Building. Plate 128.

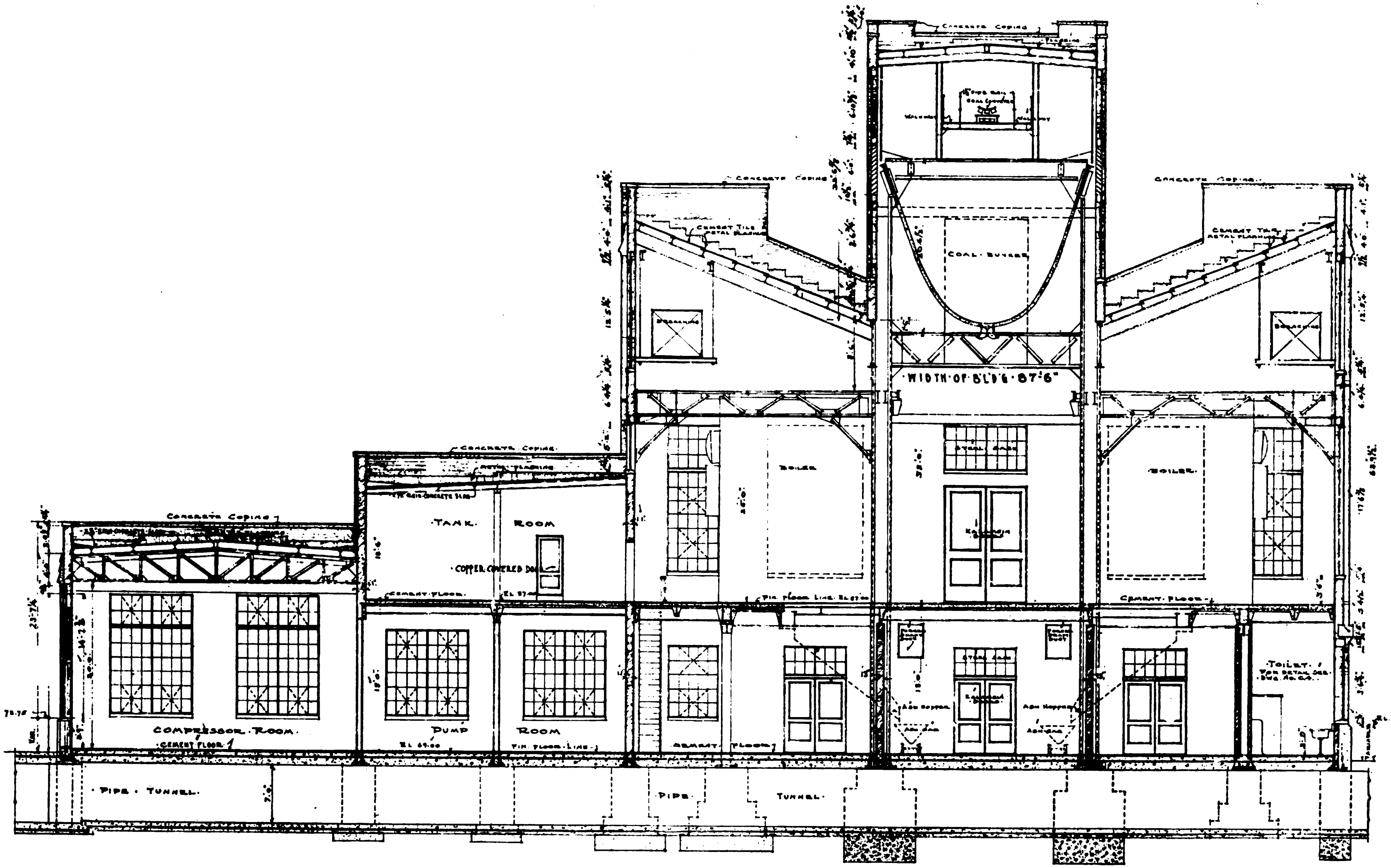
TYPICAL CROSS SECTION OF SUB-ASSEMBLY BUILDING, NEW SOUTH BEND PLANT OF THE STUDEBAKER CORPORATION.

James Stewart & Co., Engineers and General Contractors.



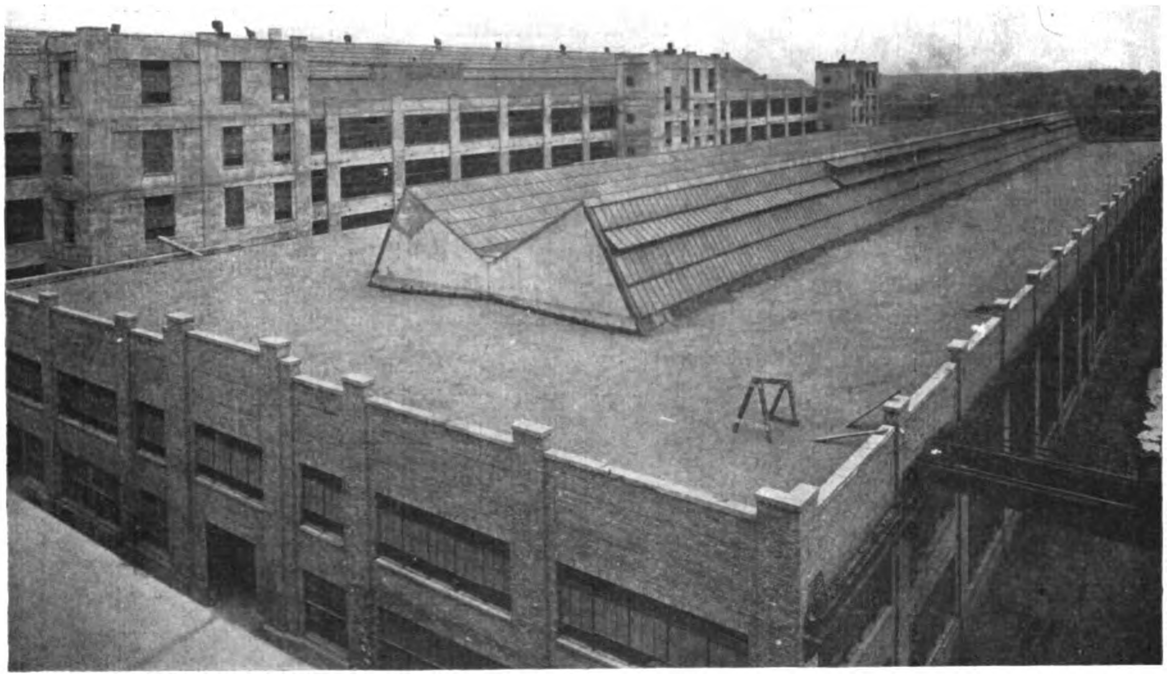
CROSS SECTION, SHOWING MACHINE SHOP CONSTRUCTION, NEW SOUTH BEND PLANT OF THE STUDEBAKER CORPORATION.

James Stewart & Co., Engineers and General Contractors.

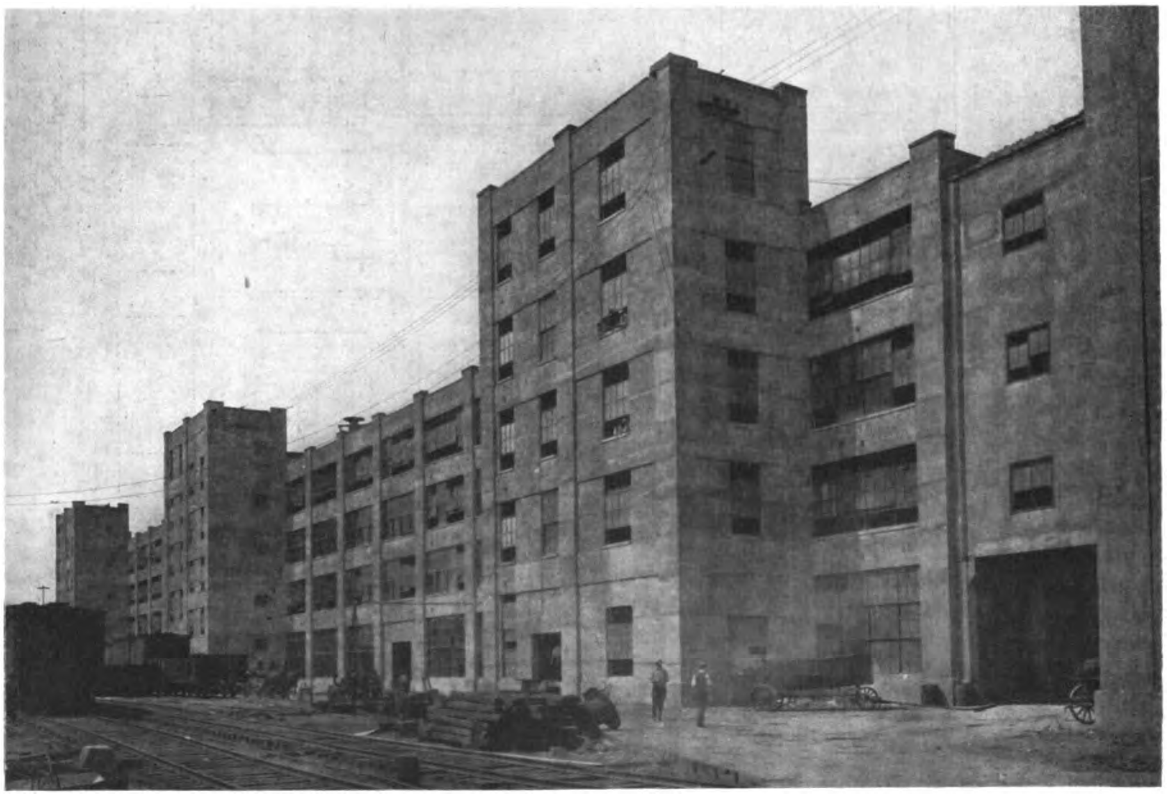


CROSS SECTION THROUGH BOILER HOUSE, NEW SOUTH BEND PLANT OF THE STUDEBAKER CORPORATION.

James Stewart & Co., Engineers and General Contractors.



PRESS BUILDING WITH MAIN ASSEMBLY BUILDING BEYOND.

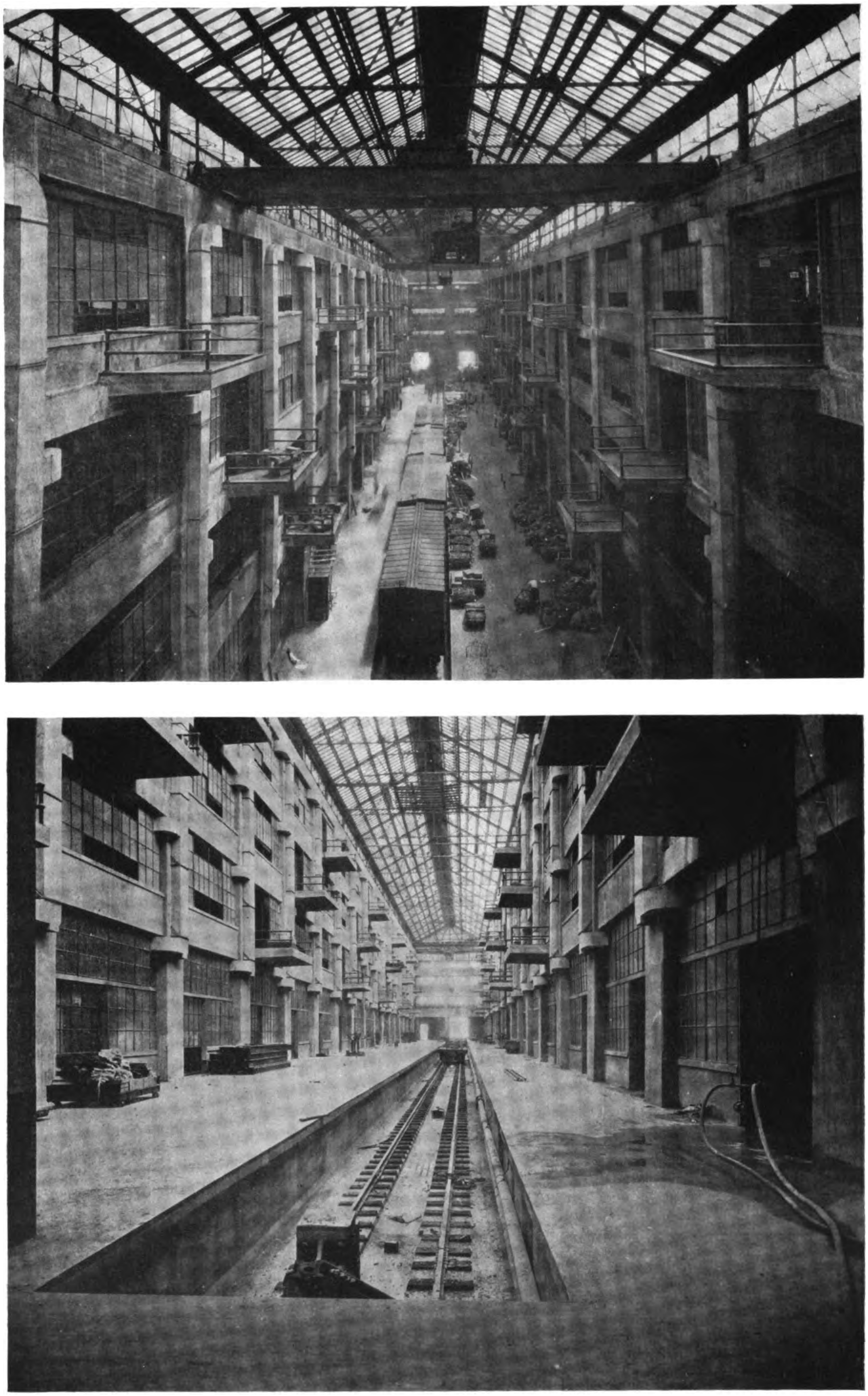


ASSEMBLY BUILDING, SHOWING CONNECTING BRIDGE TO SUB-ASSEMBLY BUILDING, NEW SOUTH BEND PLANT OF THE STUDEBAKER CORPORATION.

James Stewart & Co., Engineers and General Contractors.

Architecture and Building. Plate 131.

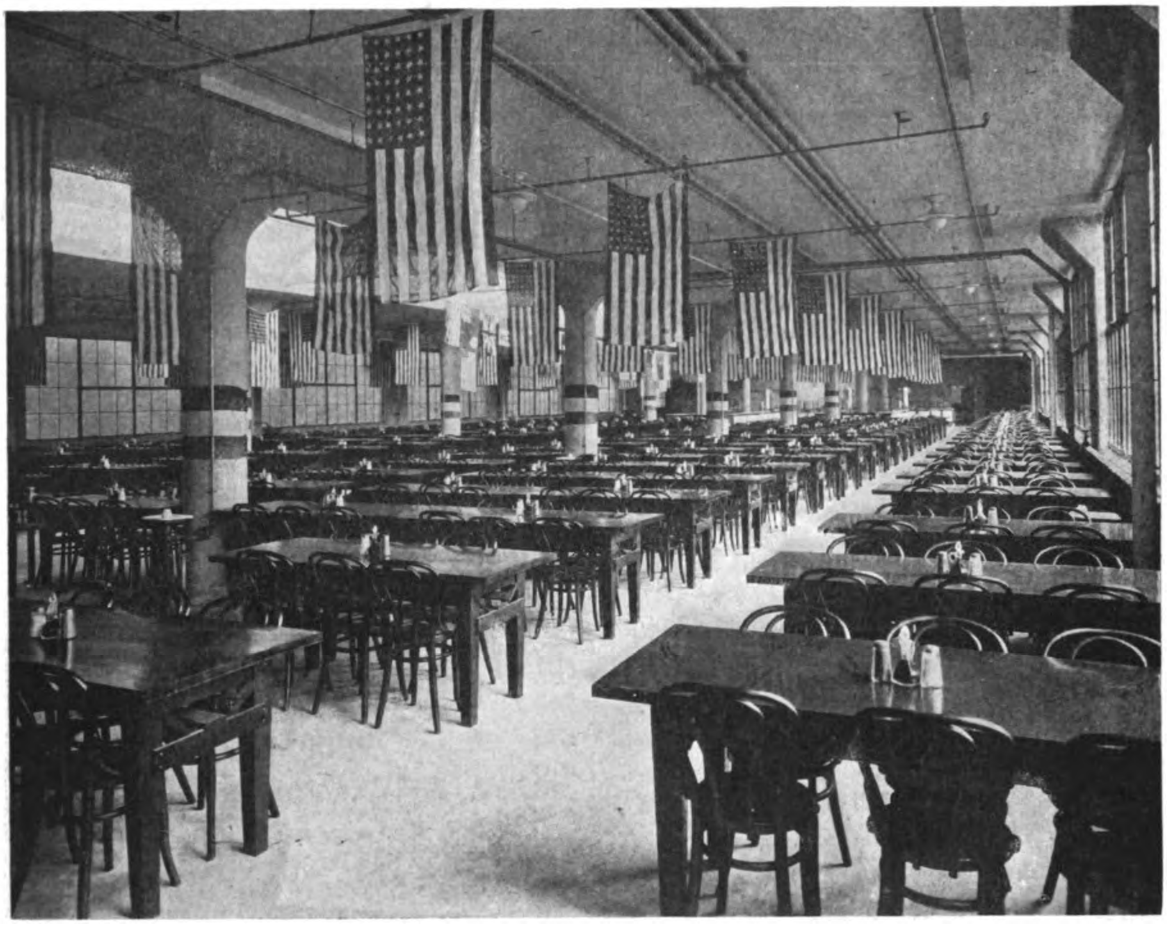
Heating and ventilating—H. Kelly & Co.; elevators—The Haughton Elevator & **Machine Co.; wrought iron pipe—**Reading Iron Co.; scuppers—Windshield Scupper **Co.; structural and reinforcing steel—**Faitoute Iron & Steel Co.

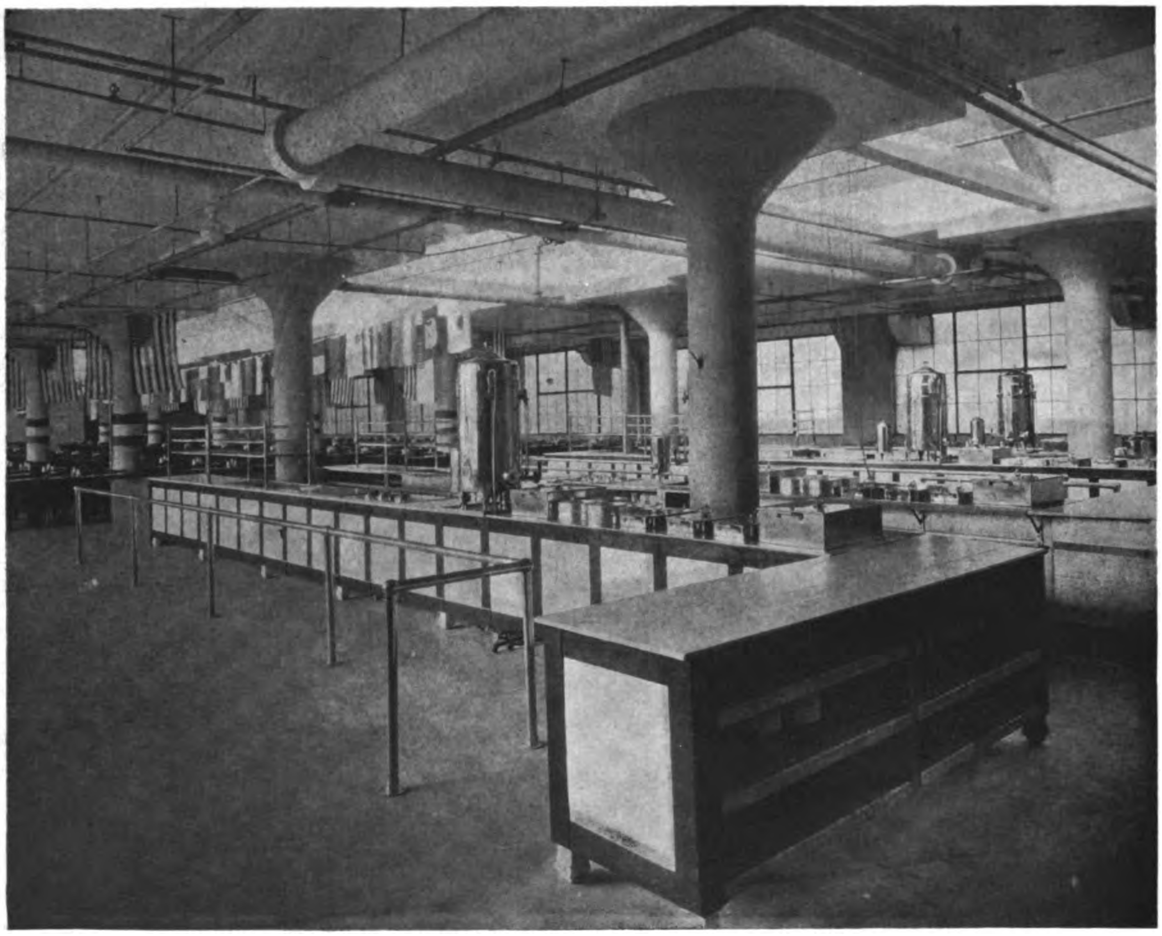


CRANE HANDLING BAYS TYPICAL IN SUB-ASSEMBLY AND ASSEMBLY BUILDING, NEW SOUTH BEND PLANT OF THE STUDEBAKER CORPORATION.

James Stewart & Co., Engineers and General Contractors.

Architecture and Building. Plate 132.
Glass and Glazing—The E. F. Hauserman Co.



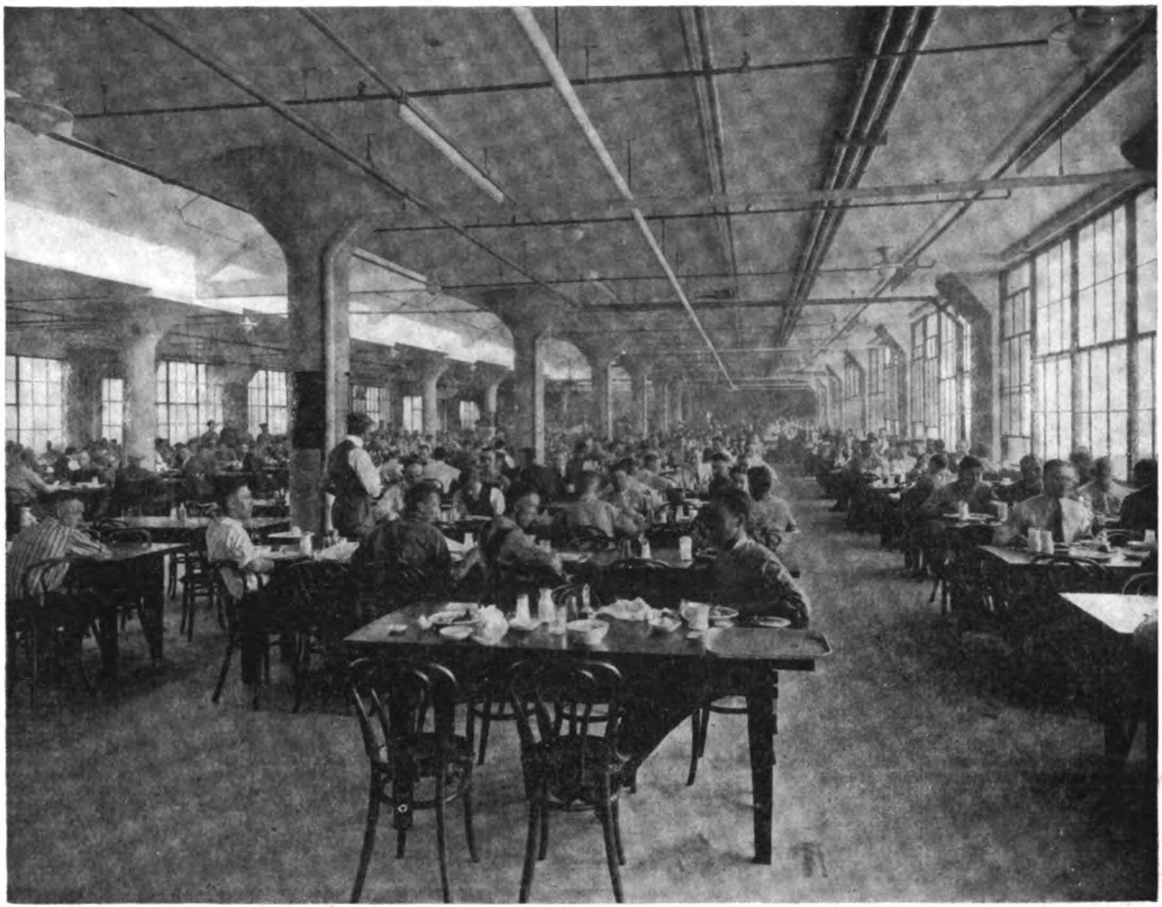


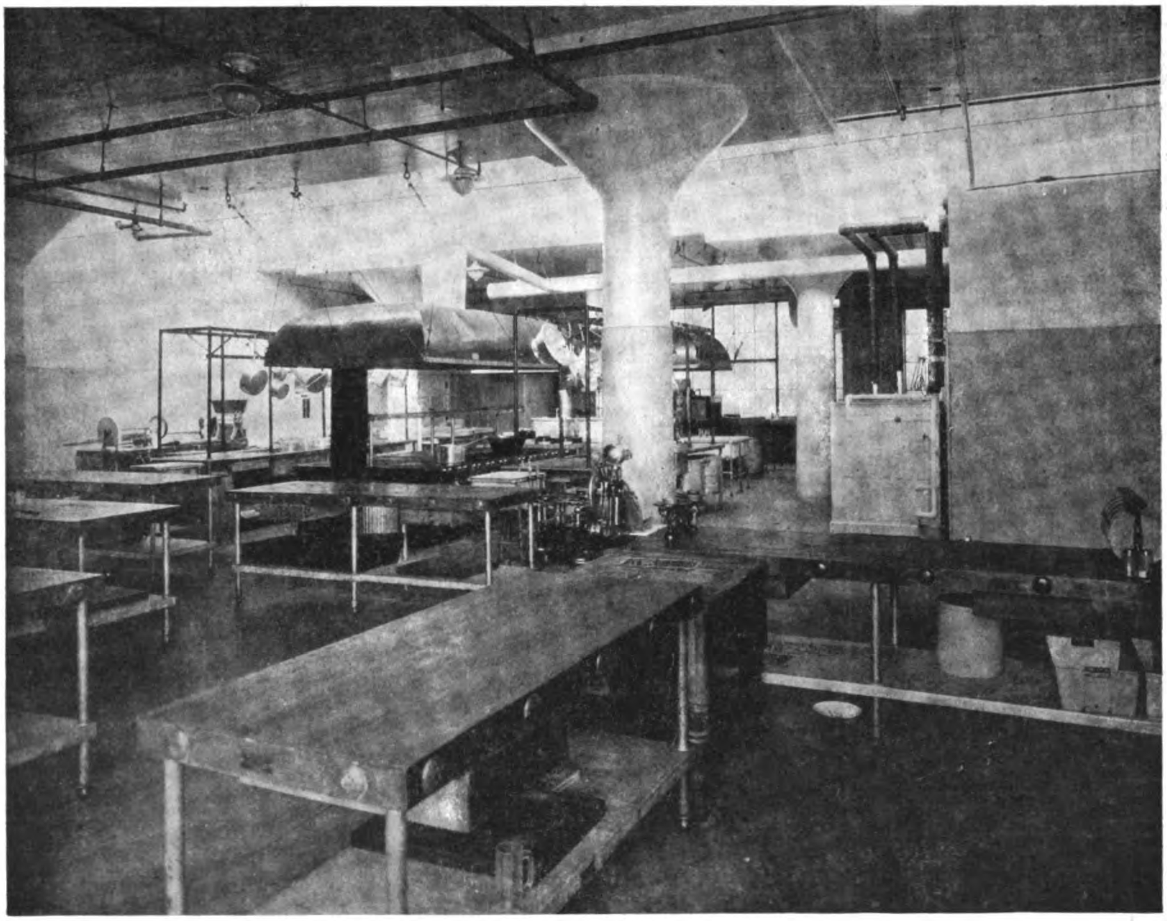
CAFETERIA AND LUNCH ROOM, NEW SOUTH BEND PLANT OF THE STUDEBAKER CORPORATION.

James Stewart & Co., Engineers and General Contractors.

ARCHITECTURE AND BUILDING. Plate 133.

Lighting system—Cooper-Hewitt Electric Co.; mill work and trim—Fitzgerald-Speer Co.

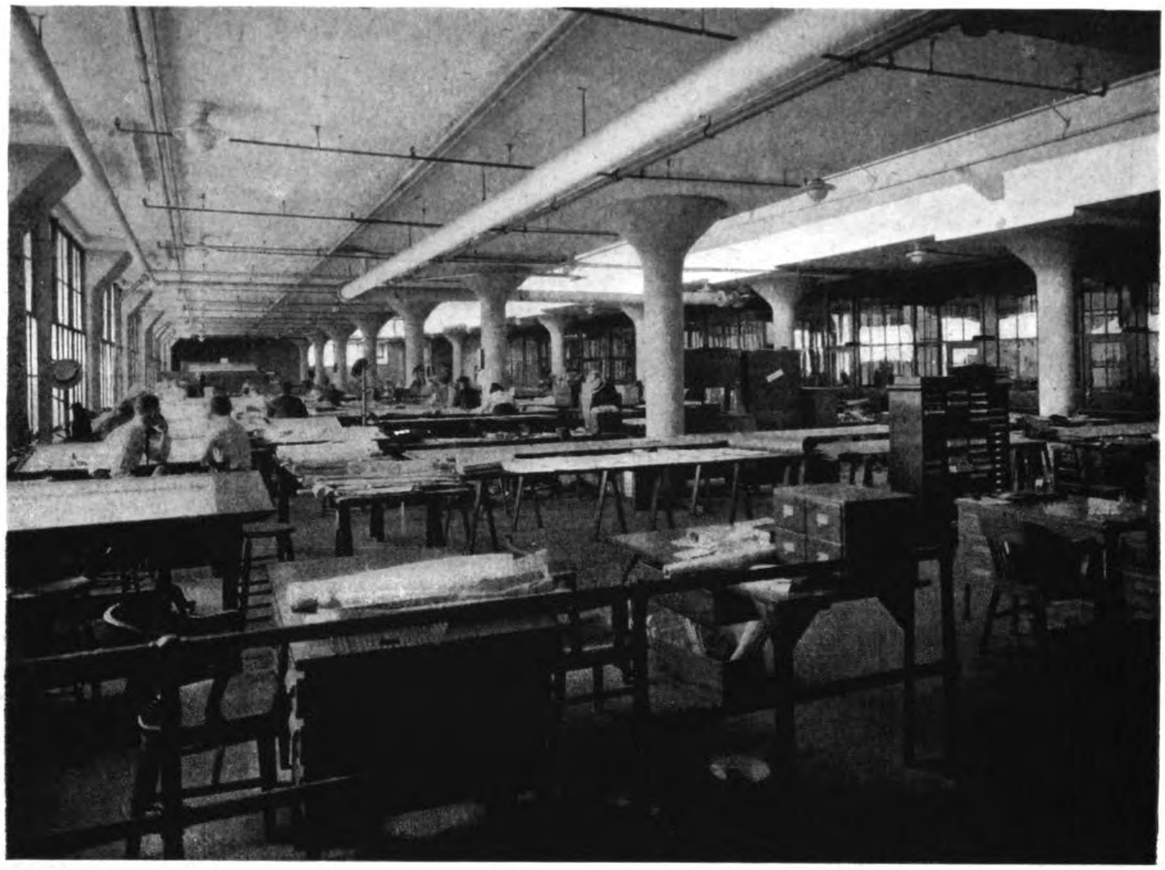




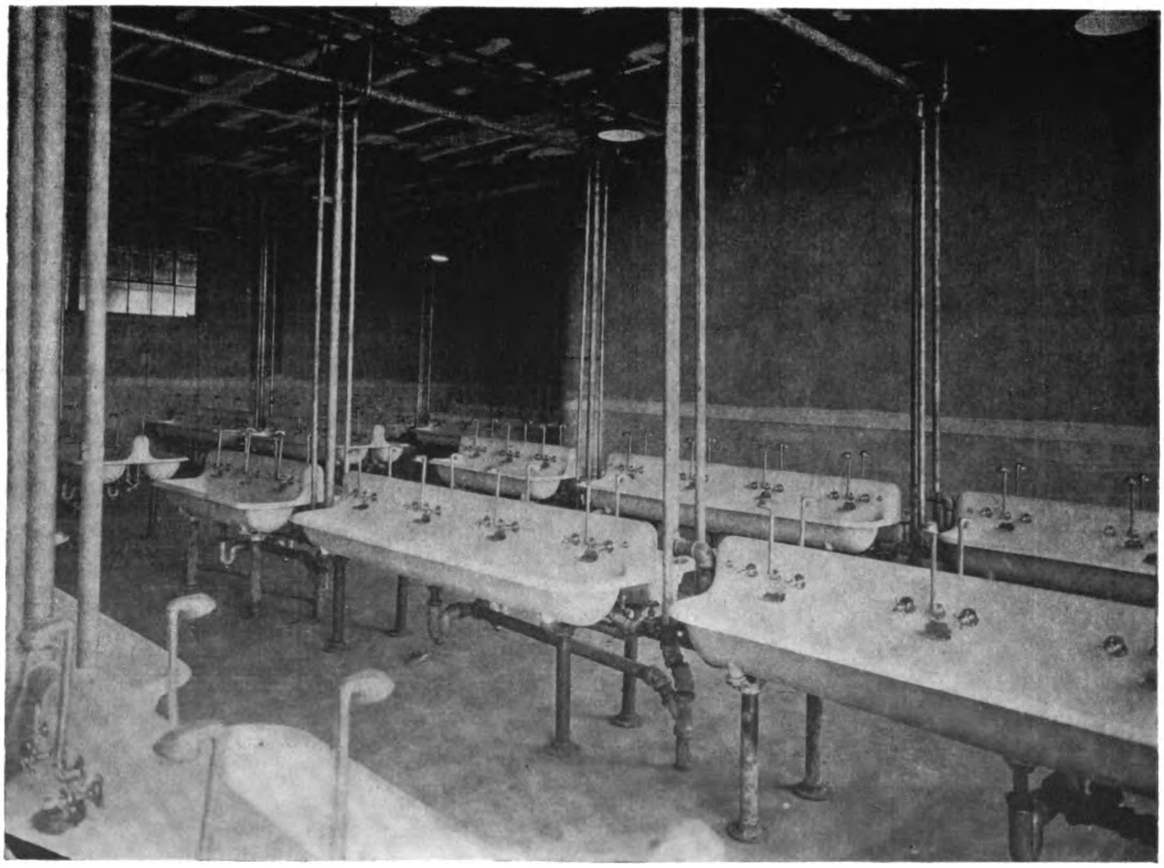
LUNCH ROOM AND KITCHEN, NEW SOUTH BEND PLANT OF THE STUDEBAKER CORPORATION.

James Stewart & Co., Engineers and General Contractors.

Corliss valve steam traps made by Plant Engineering and Equipment Co., Inc.; composition floors—The Marbleloid Co.; all metal covered doors, jambs and trim—Betz Bros.



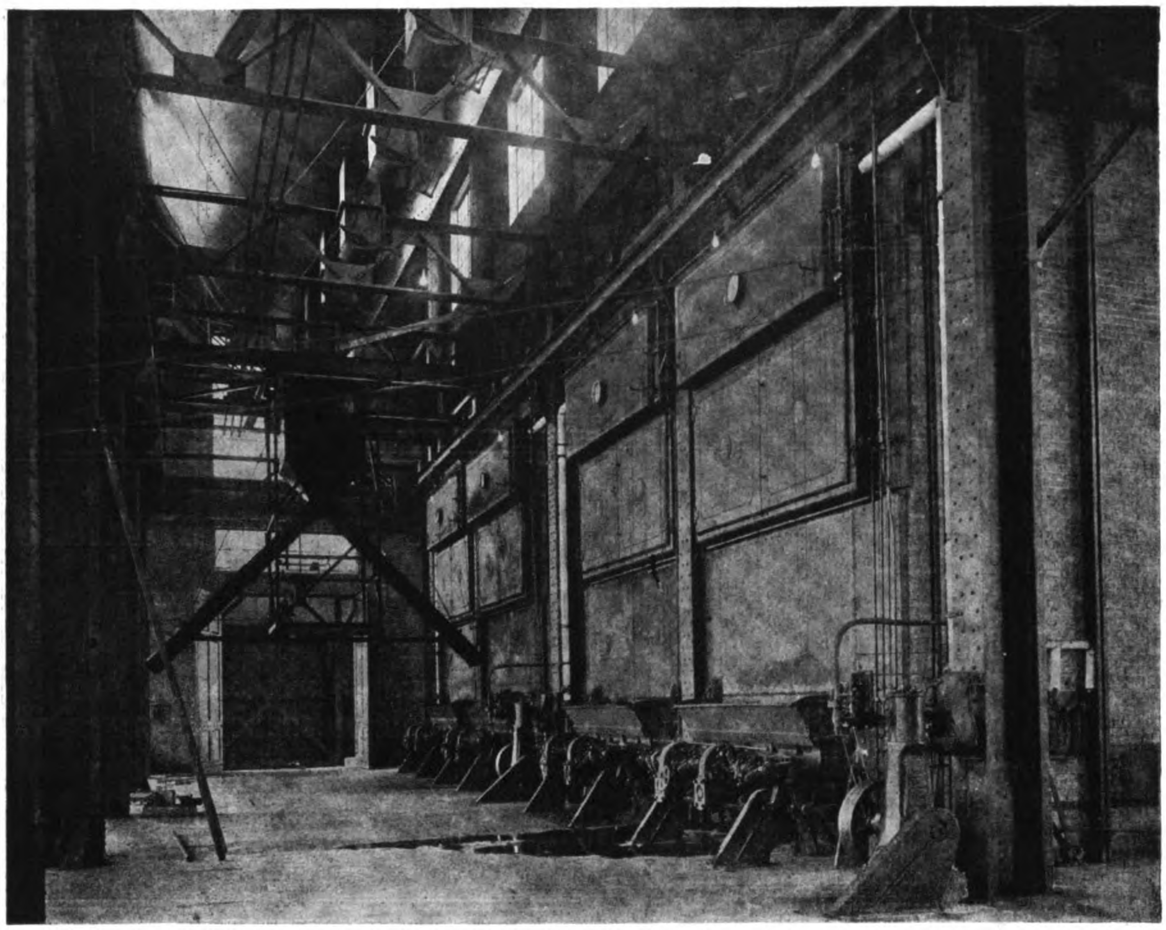
Unitbilt Glasteel partitions made by The E. F. Hauserman Co. DRAFTING ROOM



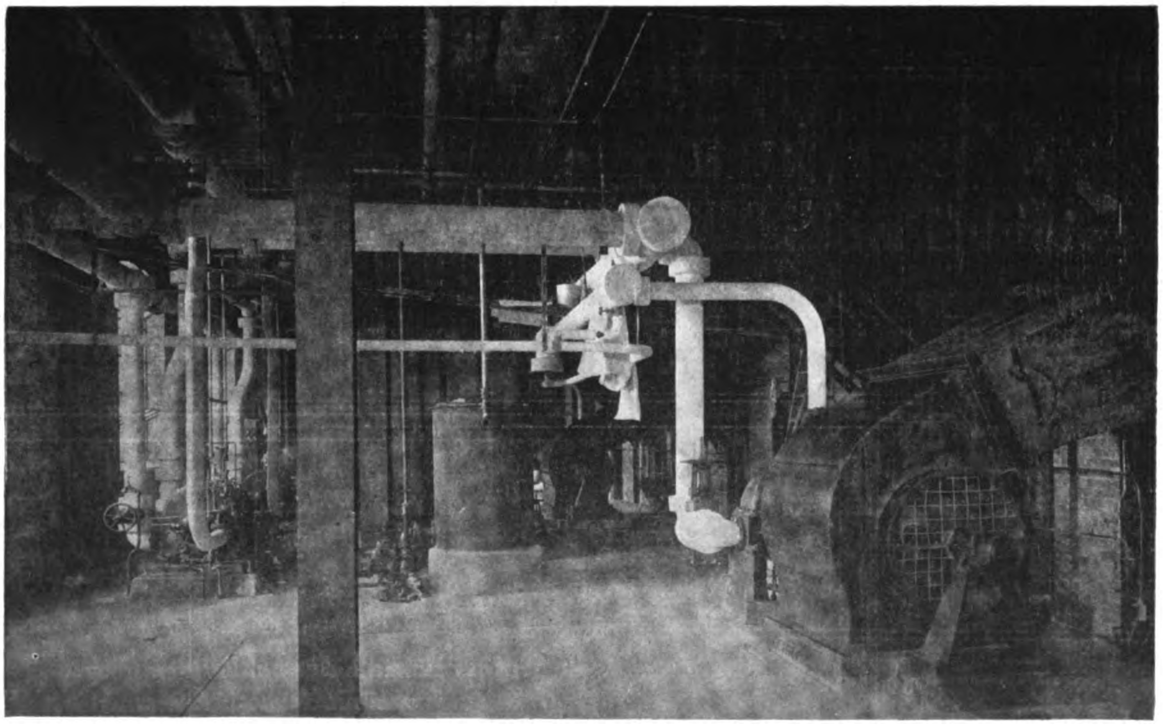
TYPICAL INSTALLATION OF LAVATORIES, NEW SOUTH BEND PLANT OF THE STUDEBAKER CORPORATION.

James Stewart & Co., Engineers and General Contractors.

Plumbing—Charles M. Oberlin & Co.; metal toilet doors—Weiss Mfg. Co.



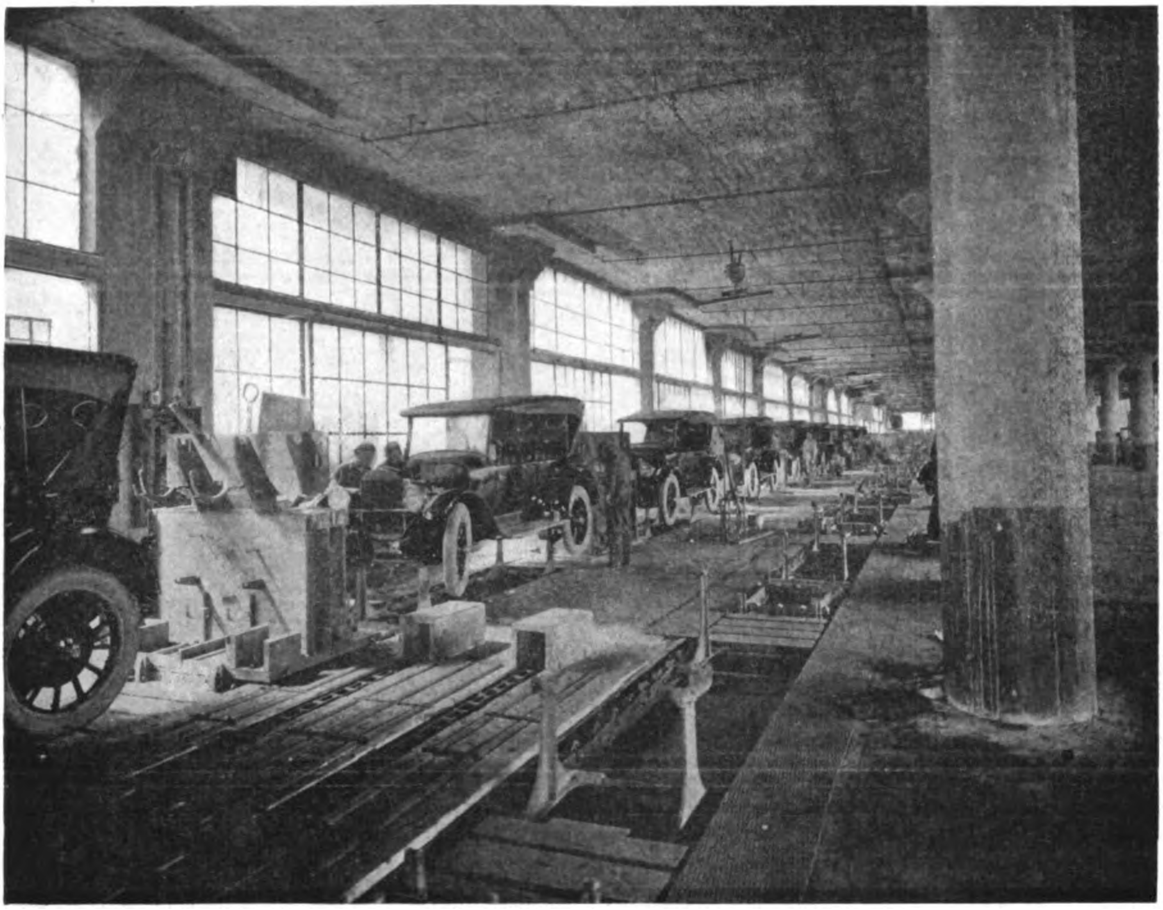
BOILER ROOM

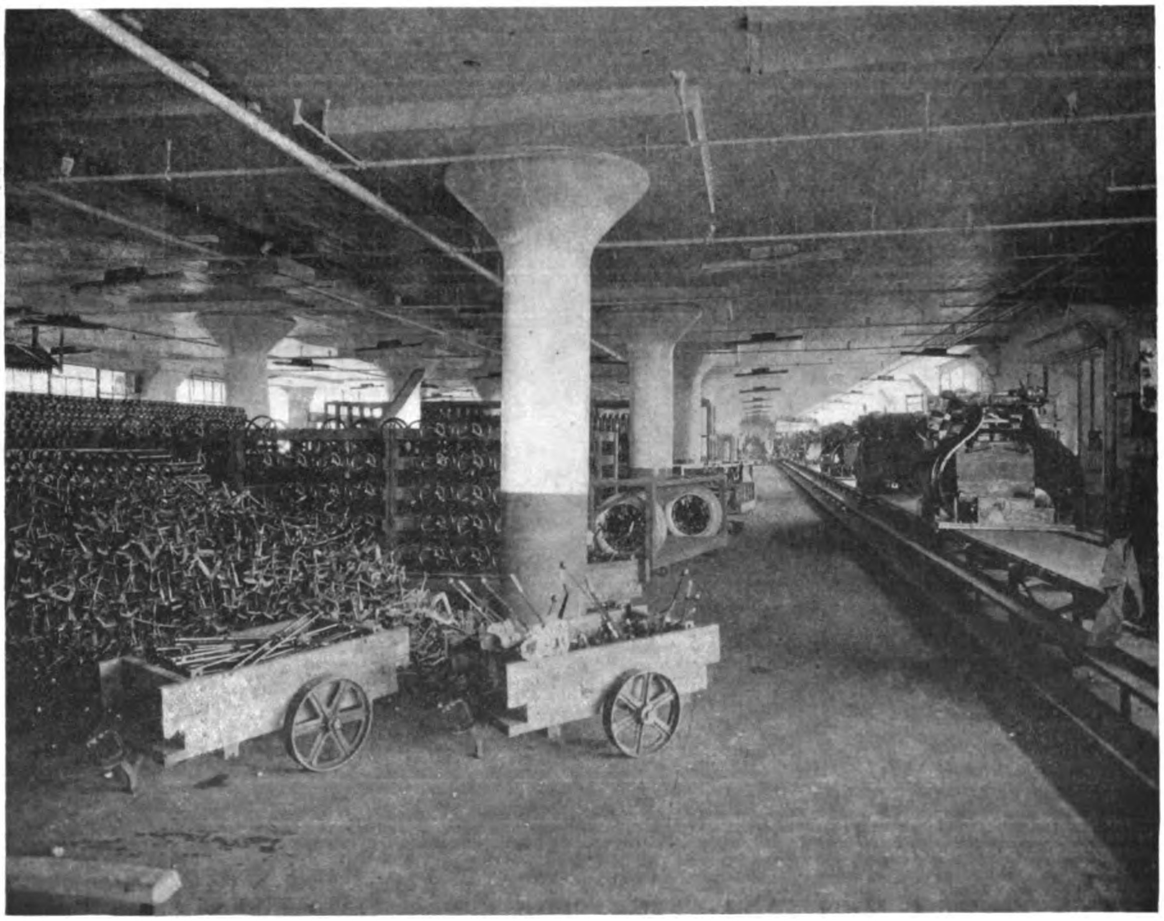


PUMP AND FAN FLOOR IN BOILER HOUSE, NEW SOUTH BEND PLANT OF THE STUDEBAKER CORPORATION.

James Stewart & Co., Engineers and General Contractors.

ARCHITECTURE AND BUILDING. Plate 136.
Boilers--Heine Safety Boiler Co.



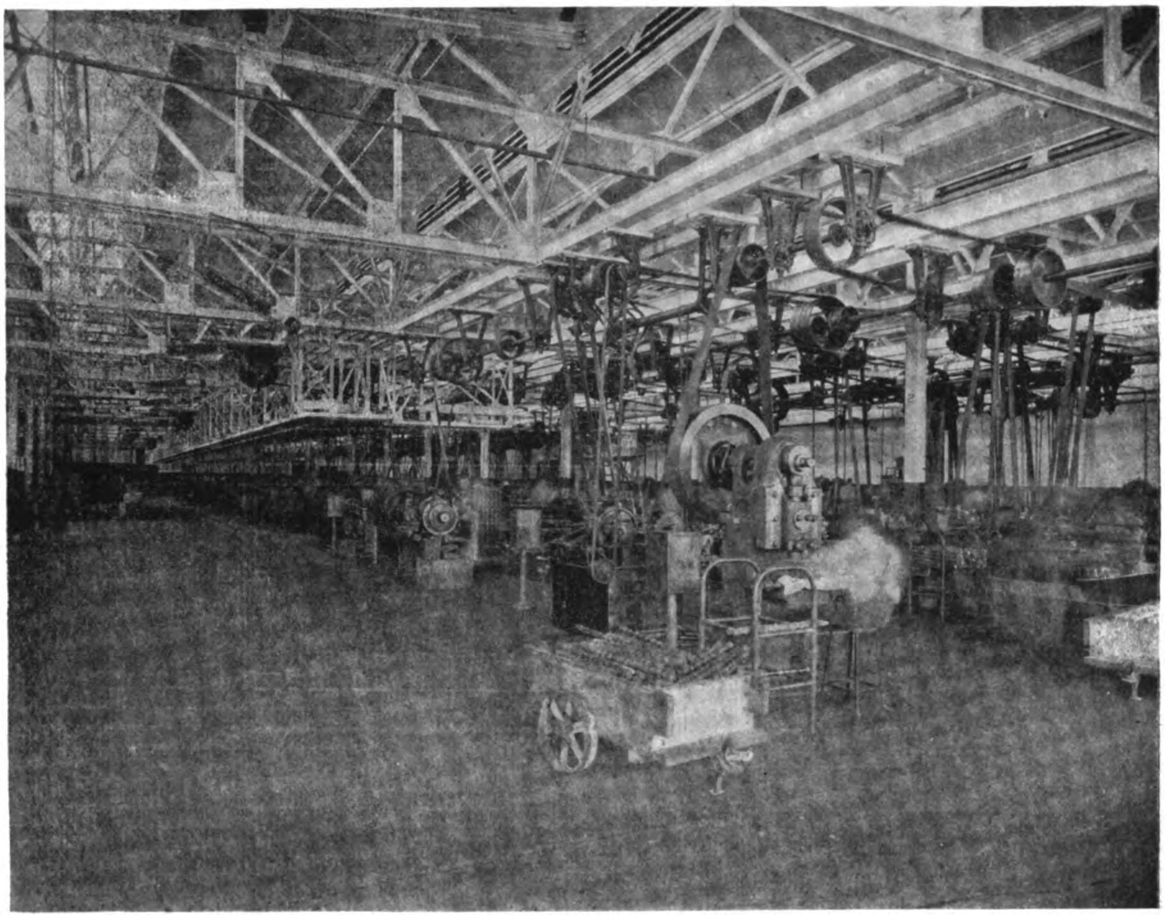


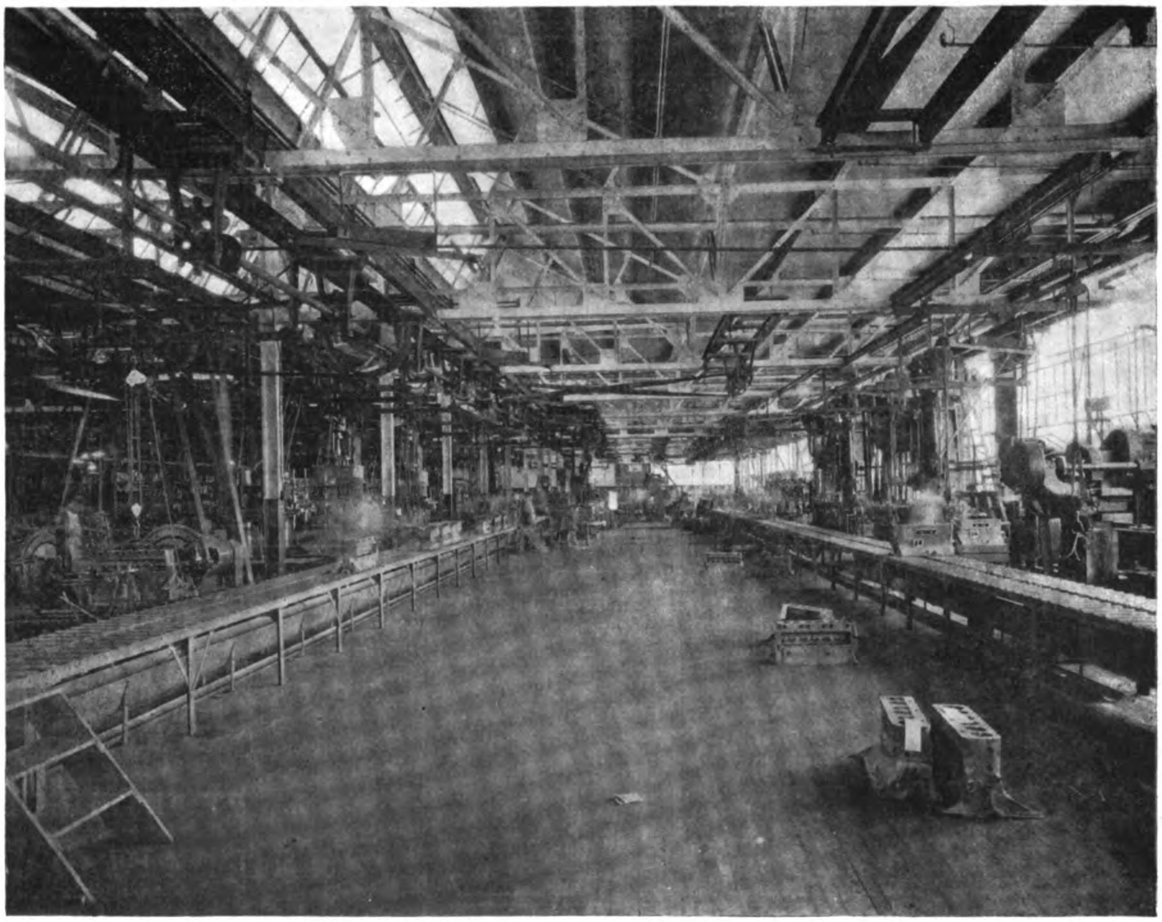
ASSEMBLY PROCESS, NEW SOUTH BEND PLANT OF THE STUDEBAKER CORPORATION.

James Stewart & Co., Engineers and General Contractors.

Architecture and Building. Plate 137.

Asphalt block floors—Asphalt Block Pavement Co.; hydraulic piping, valves and fittings installed by Pittsburgh Valve Foundry & Construction Co.



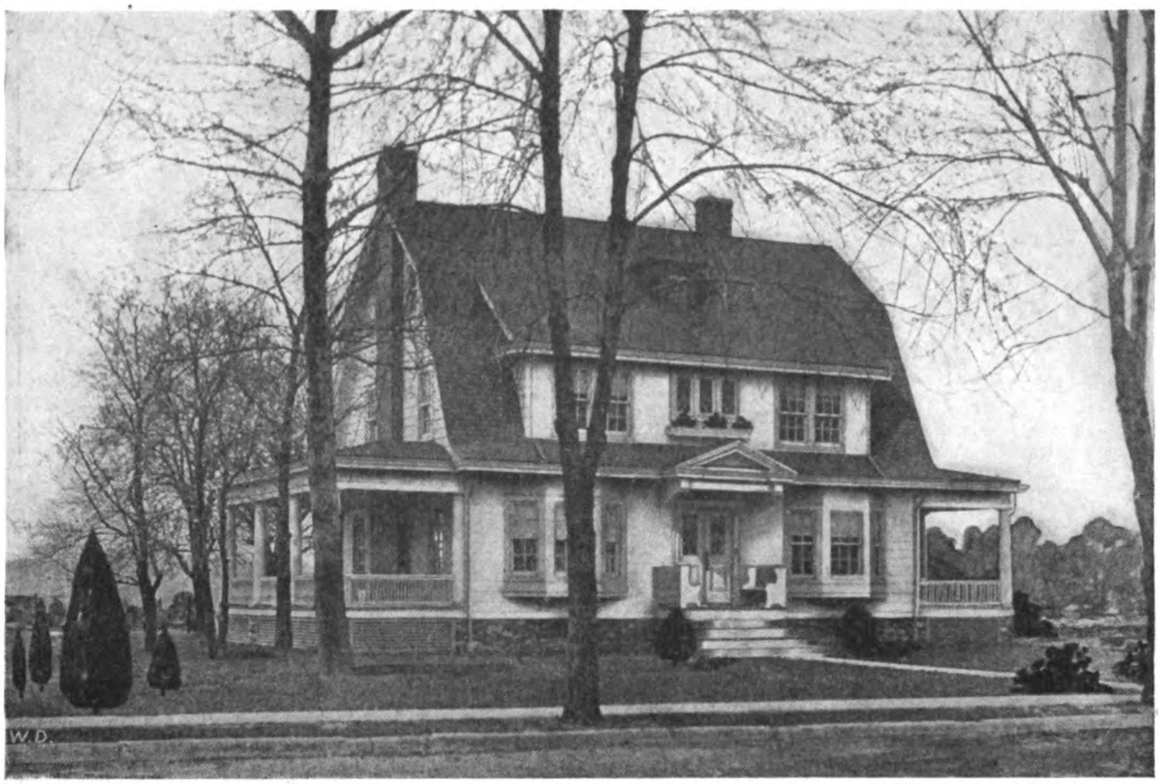


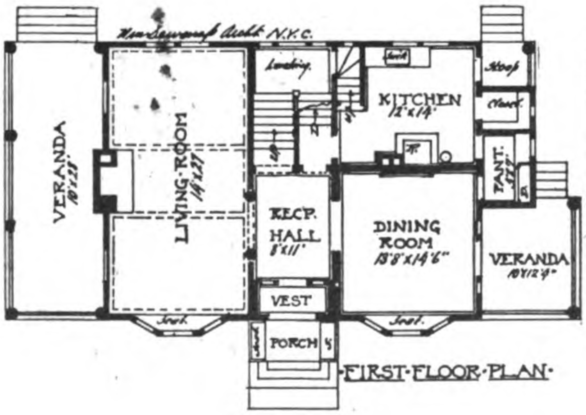
VIEWS IN MACHINE SHOP, NEW SOUTH BEND PLANT OF THE STUDEBAKER CORPORATION.

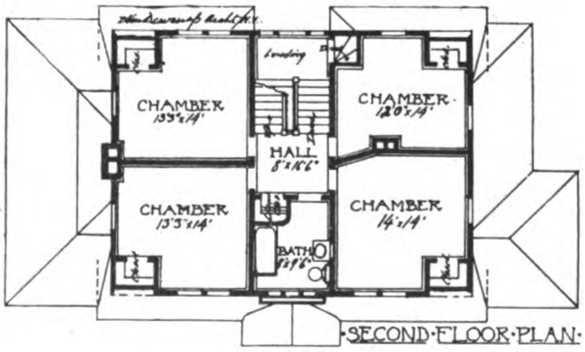
James Stewart & Co., Engineers and General Contractors.

ARCHITECTURE AND BUILDING. Plate 138.

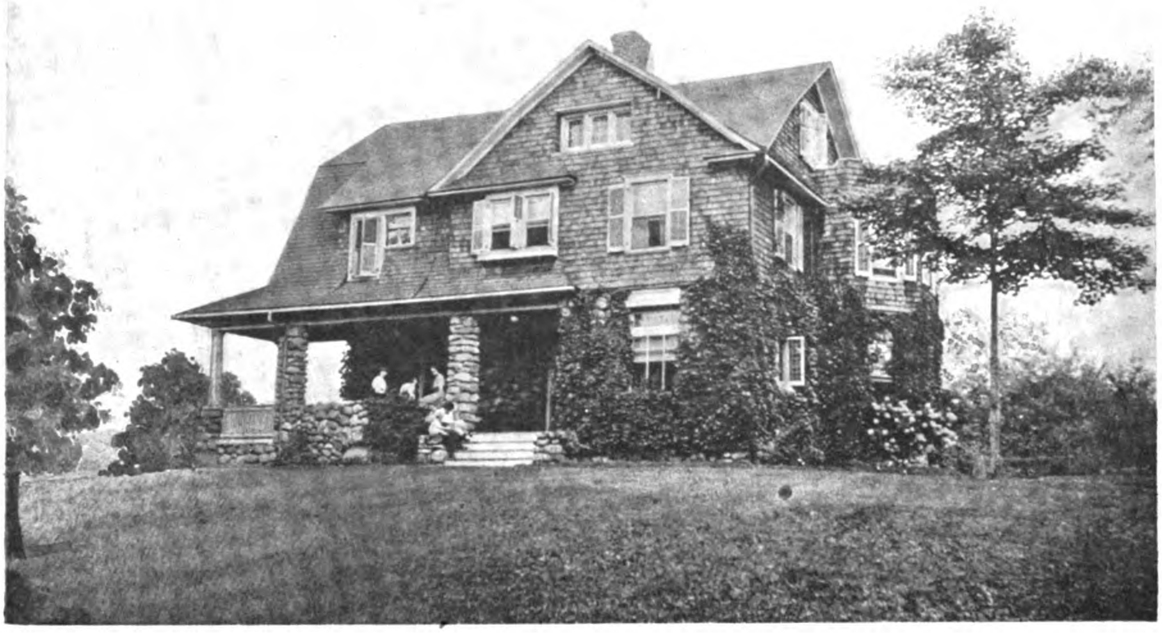
Multiple spindle drills—The National Automatic Tool Co.; automatic crank shaft milling machines—William K. Stamets; gear hobbing machines—Barber-Colman Co.; lathe machines for crank shafts—Wickes Brothers.

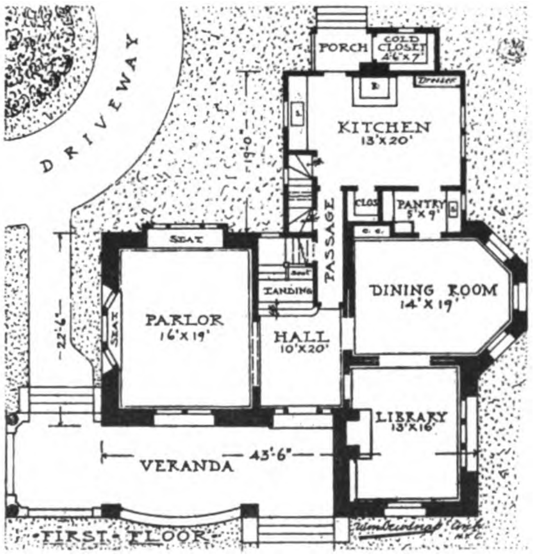


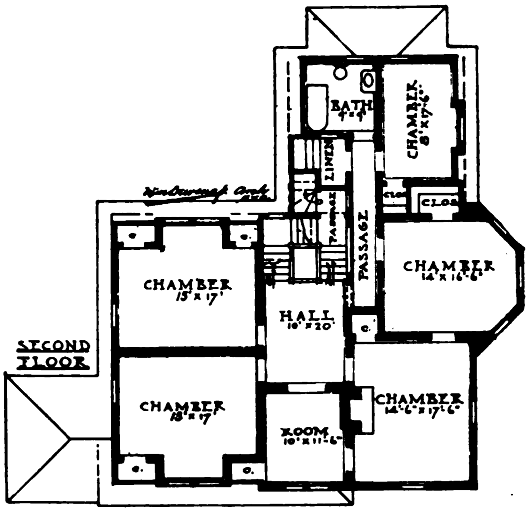




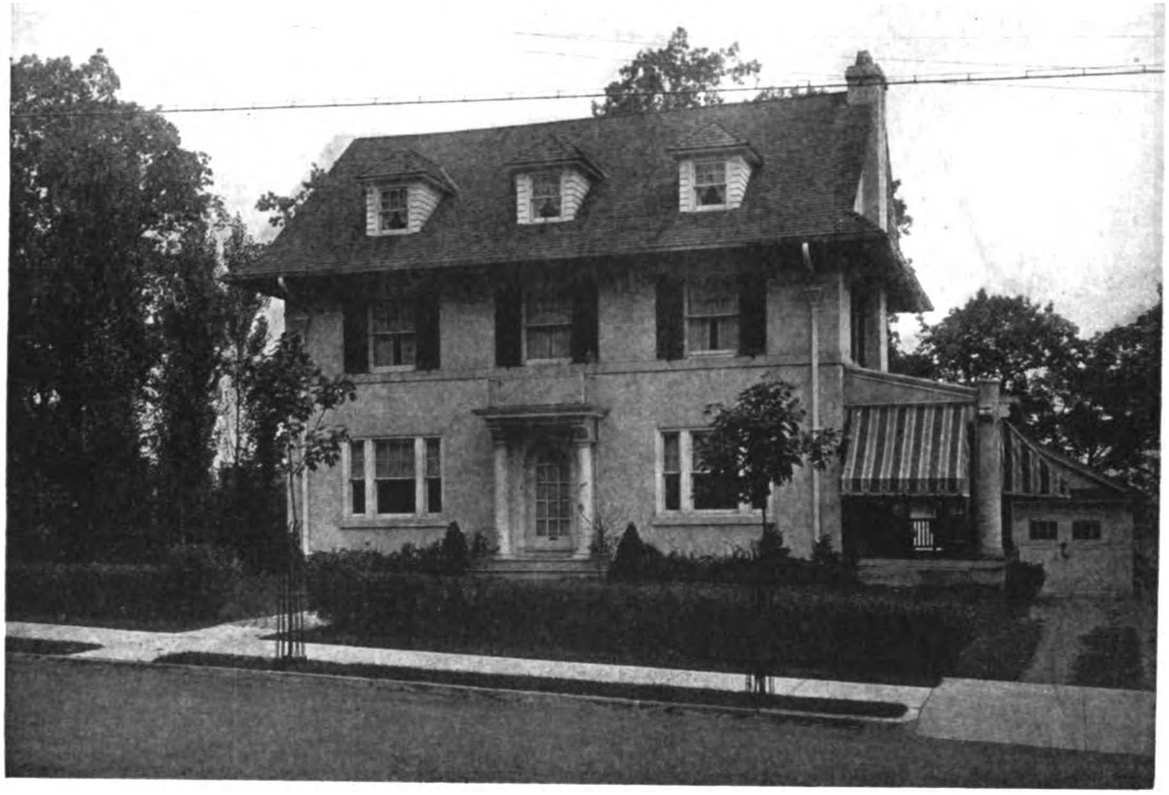
RESIDENCE AT COLONIAL HEIGHTS, TUCKAHOE, N. Y.
William Dewsnap, Architect.

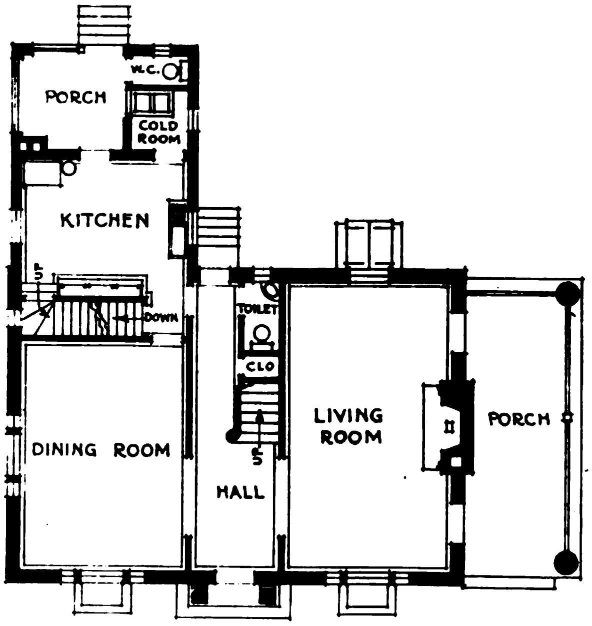




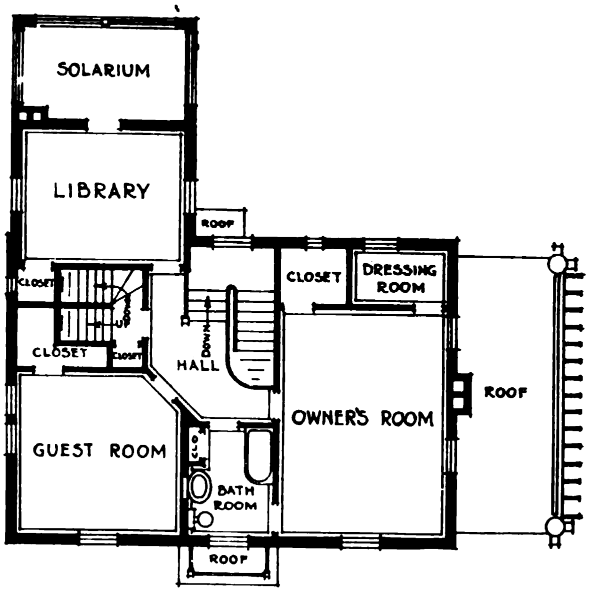


ELEVEN-ROOM SHINGLE HOUSE.
William Dewsnap, Architect.



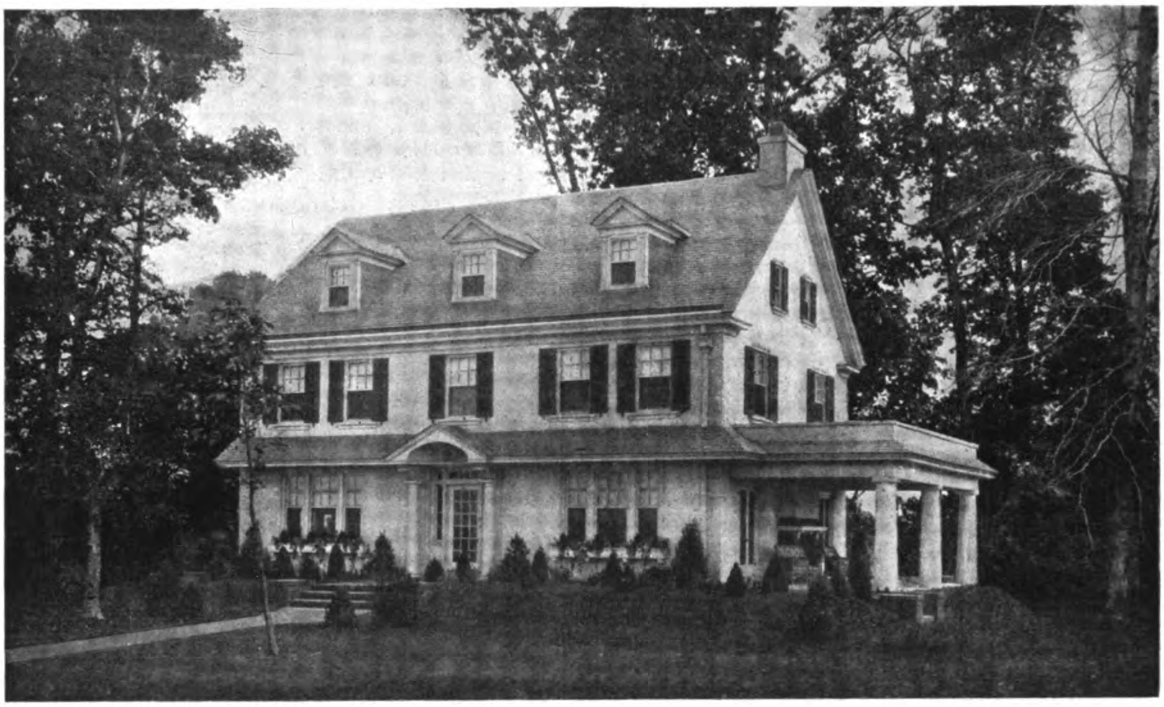


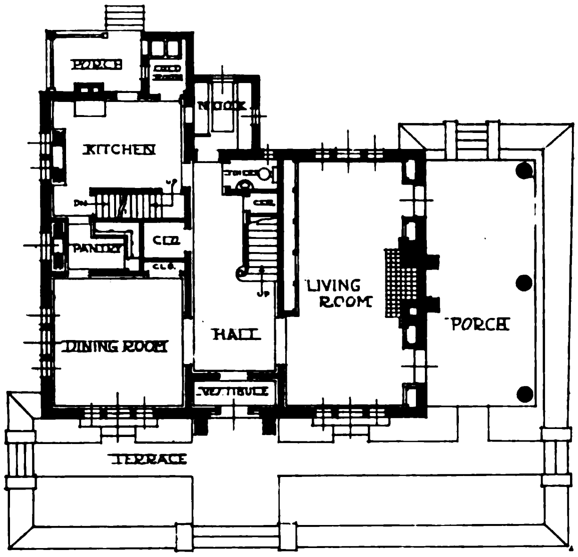
FIRST FLOOR

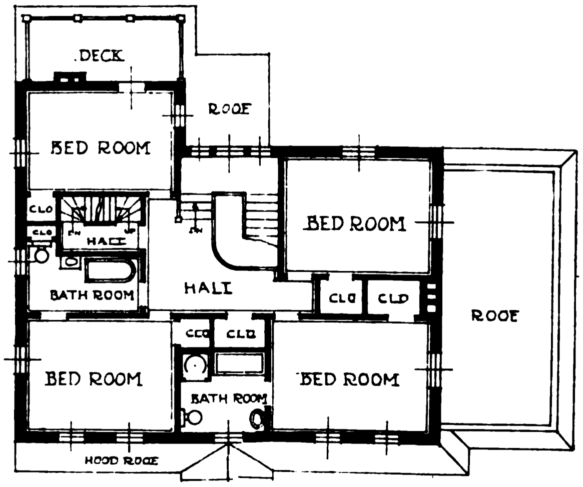


SECOND FLOOR

HOUSE AT POTTSVILLE, PA.
C. E. Schermerhorn and Watson
K. Phillips, Associate Architects.







INTERESTING DESIGN OF A SUBURBAN HOUSE.
C. E. Schermerhorn, Architect.

(Continued from page 98)

For the protection of the power, heating and drying systems throughout the plant, steam traps have been installed at the necessary points. The requirements are continuous service, positive drainage of condensation and the saving of steam in the various processes. The Corliss Valve Steam Traps, made by Plant Engineering & Equipment Co., were installed for this purpose. These are float traps of the continuous flow type on both high and low pressure, and consist of but six parts of which only the valve is movable, so there is hardly any wear.

As condensation results from the process of heating, drying or steam power, it is received by the trap, then automatically drained and discharged while at the same time holding back the steam for useful work. In this manner the entrained water is removed from the system, thereby delivering dry steam without any waste or leakage and making all the heat units in the steam available for use which results in rapid heating up and economical operation.

The Westinghouse-Krantz types safety panels are used throughout. The inner door of these panel boards gives access to the switches, where every reachable part is dead. The outer door, which covers the fuses, is locked so that only authorized persons can open it.

As half the expenditure which was required to put this plant in operation was for the mechanical equipment some of the more important machinery should be mentioned. The most expensive machine which was purchased was a large press for stamping and forming two side rail frame members of an automobile at one stroke. The E. W. Bliss Co. made this, but the majority of the presses for sheet metal were furnished by the Toledo Machine Co. For cutting gears, the roughing machines were hobbing machines made by the Barber-Colman Co. The spiral bevels are generated on the latest type of Gleason spiral bevel gear generators. The milling machines were all furnished by the Cincinnati Milling Machine Co. and are largely of automatic types. Another very large installation is the equipment purchased from the National Automatic Tool Company which consists of 37 machines which are known as multiple spindle drills. These consist of machines carrying one, two and three heads upon which are arranged drill spindles in various arrangements so that a large number of holes are drilled at once. Another very ingenious series of machines and entirely special, are the machines for milling the periphery of the cheeks of the crankshaft which is done automatically on the machines built by Wm. K. Stamets. The large special heavy lathes for the turning operations on the crankshafts were supplied by Wickes Brothers.

ARCHITECTURAL LEAGUE EXHIBITION

Through the courtesy of the Park Commission of the City of New York, with the cordial consent of the Trustees of the Museum, the Architectural League of New York has undertaken to hold its Annual Exhibition of Architecture and the Allied Arts in the unfinished south wing of the Metropolitan Museum of Art.

The Exhibition will be opened about March 25, and will close April 26, 1921.

Detailed circular of information regarding the Exhibition will be published later by the Secretary, Mr. Lawrence Grant White.

Book Reviews

BUILDING PLANS FOR MODERN HOMES. By Frederick H. Gowing, Architect. Boston, Mass., Published by the Author. Paper, 8x10 inches, 110 pages.

This book of house designs covers a wide range of plans from bungalows to medium size houses of colonial type. The exterior is presented by a photographic reproduction and first and second floor plans are shown. A short description accompanies each design so that it is possible to figure upon the approximate cost to build the houses in various localities. The bungalows are of the types most frequently seen in California and are of shingle finish but not a few are stucco and all are attractive. A study of the plans will reveal many interesting things and the variety in the arrangements is sufficient to satisfy the demands of most anyone. One of the plates shows a rather novel planning of a seven room house. The plan is square with central reception hall, to one side the living room and den, to the other dining room and kitchen and at the rear a small chamber. A stairway from the reception hall leads to the second story where two bedrooms and a bath are immediately over the dining room and kitchen and a large flat roof over the other portion of the house forms a roof garden. The mission style lends itself admirably to this arrangement of plan and gives a very effective exterior.

COUNTRY AND SUBURBAN HOUSES. By William Dewsnap, Architect. New York, Published by the Author. Paper 9x12 inches, 56 pages. Price, $3.00.

This book contains a collection of house designs in various styles ranging in size from medium size houses of eight to ten rooms to houses of twenty to twenty-five rooms. Colonial and English half timber designs as well as stone and stucco exteriors are shown. Plans accompany all and in a number of cases plots of the grounds are given. The illustrations are from photographs both of the exteriors and interiors, and details such as verandas, sun parlors and fireplaces are given. The author gives an introductory note and follows with suggestions on interiors and a general outline to be followed in preparing specifications. A blue print list accompanies the book which gives the cost of construction of the various designs based on 1920 prices. The designs are each accompanied by a short description and the range of cost is from $8,000 to $100,000, with the majority however at about $15,000 to $20,000.

Current Notes

RADIUM'S ROLE IN INDUSTRY AS A LIFE SAVER

The great mass of accidents in factories, in mines and in other industrial institutions where darkness is a creator of danger, are being eliminated through the newest invention of science—radium luminous material. Radium illuminated watches are familiar articles. The same ma-

(Continued on page 20—advertisement)

December

ARCHITECTURE AND BUILDING

PUBLISHED BY THE WILLIAM T. COMSTOCK COMPANY NEW YORK

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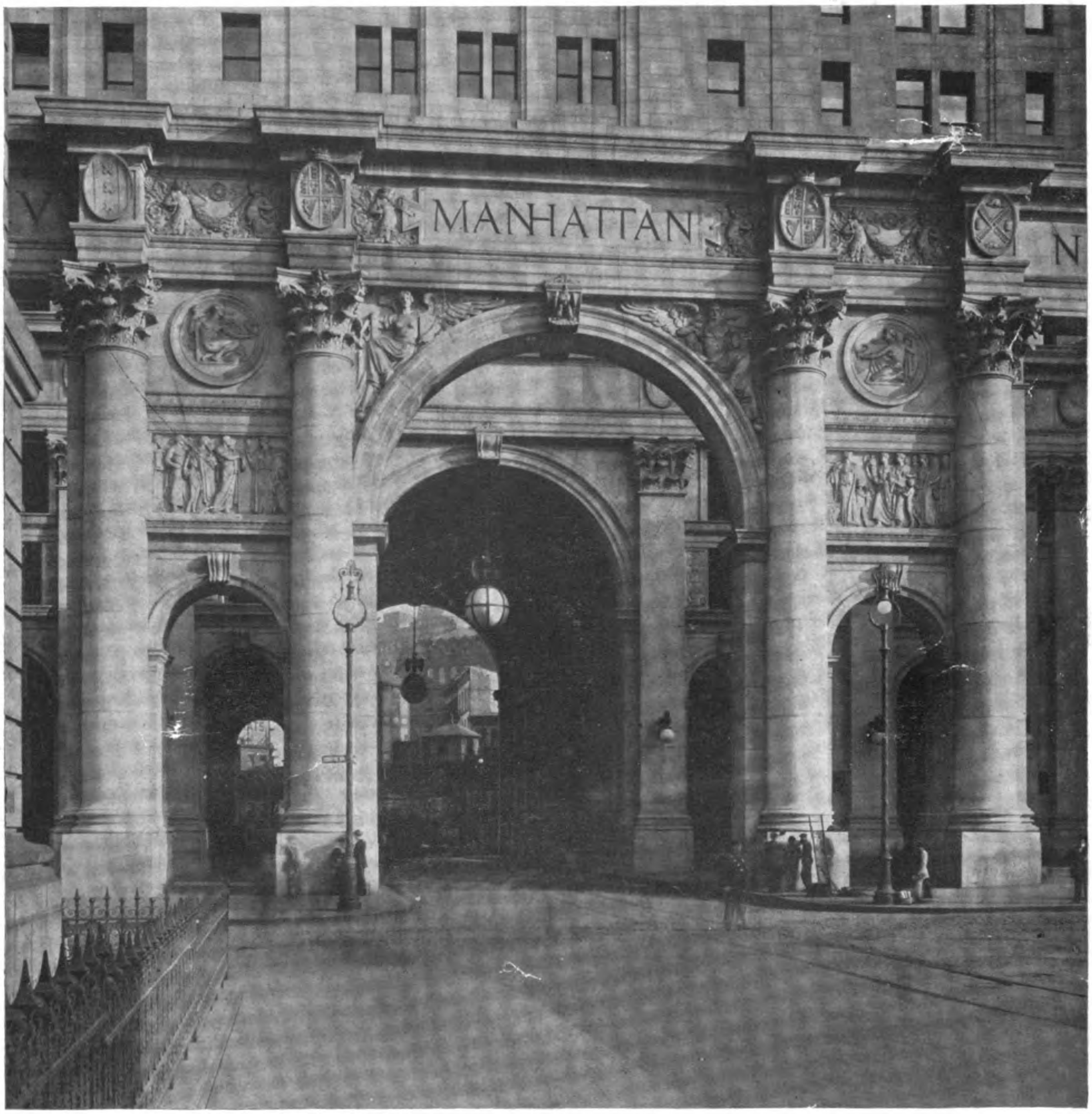

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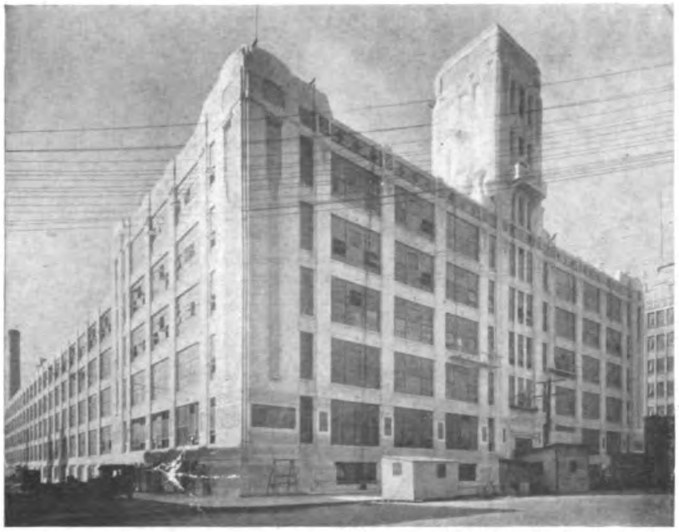
ON

Fifteen Acres of Floors



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Volume LII
Number 12

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McKim, Mead & White, Architects
Photo, S. G. Cleveland

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Eugene DeRosa, Architect

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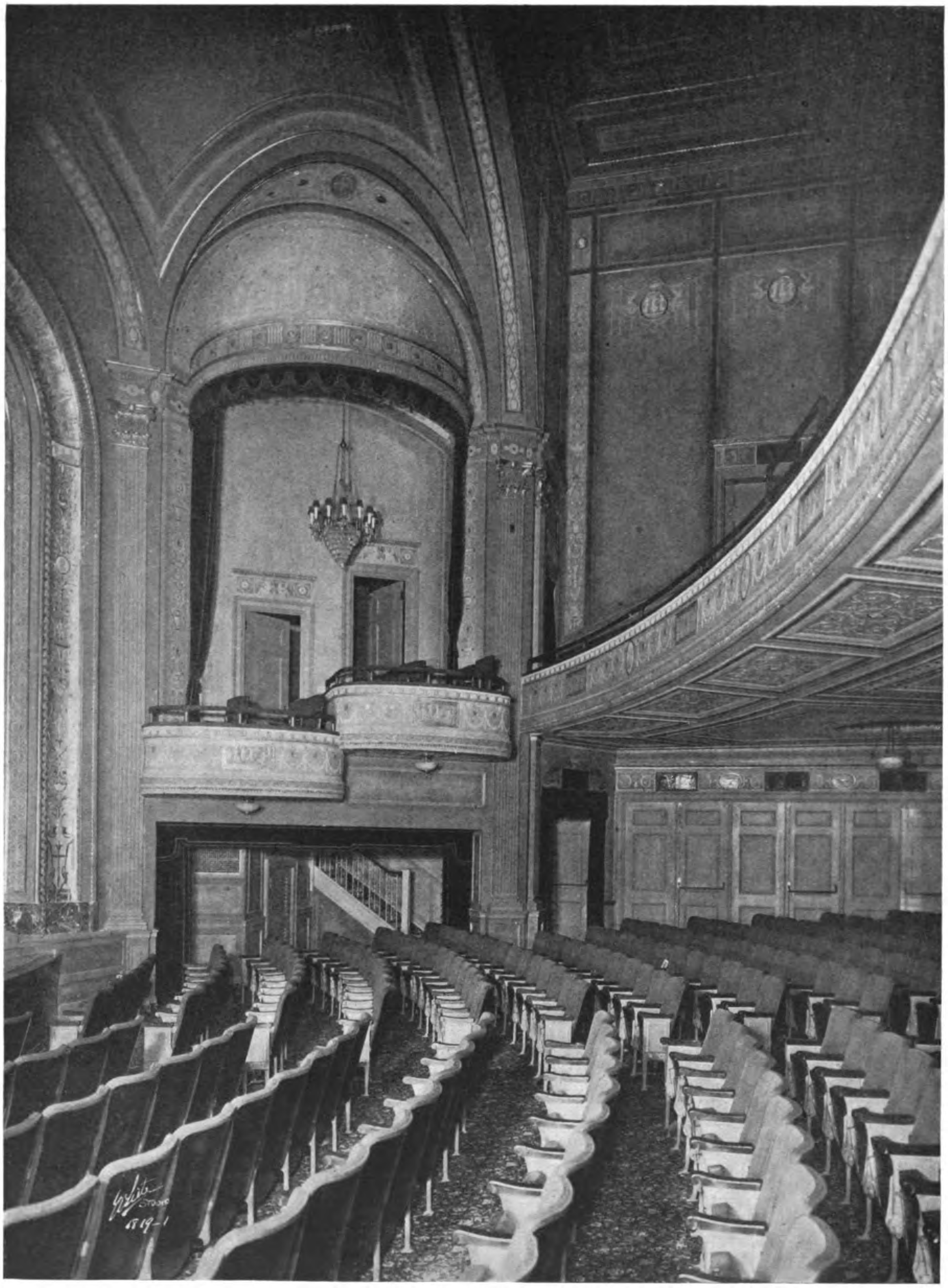


AUDITORIUM, TIMES SQUARE THEATRE, WEST 42nd STREET, NEW YORK CITY.

Eugene De Rosa, Architect.

ARCHITECTURE AND BUILDING

A Magazine Devoted to Contemporary Architectural Construction

WILLIAM P. COMSTOCK
Managing Editor

Volume LII DECEMBER, 1920 Number 12

THE MODERN INDUSTRIAL PLANT OF THE AMERICAN CHICLE COMPANY

By William E. Groben

Industrial success is determined by the wealth which is earned and distributed as the direct result of the demand for manufactured products based on their quality and usefulness. Both the individual manufacturer and the industrial concern are unceasingly engaged in determining and applying those policies and business methods by which this success may be achieved.

They are interested primarily in arriving at the fundamental principles involved in producing satisfactory earnings. When reduced to the final analysis these principles consist of insuring equitable treatment of both customers and employees, by producing articles which satisfy the public demand, and by providing clean, wholesome and attractive buildings in which their employees may work.

It is a recognized fact that more and better work is produced in properly lighted, efficiently ventilated, sanitary, hygienic and architecturally pleasing surroundings than where these elements are lacking. Furthermore, the labor turnover is greatly reduced and the personnel of the workers improved, thereby stimulating greater production, by the installation and maintenance of welfare work, together with a more considerate and generous attitude toward employees.

It is universally conceded that the most promising opportunities for success depend upon directing attention to this phase of industrial life in order to increase efficiency in production. To accomplish these purposes and at the same time to reduce to a minimum the cost of producing and handling the goods, industrial buildings must be especially designed to adequately fulfill the requirements of each particular business.

Only within comparatively recent years has the manufacturer or industrial corporation given serious thought to the employment of an architect to design their industrial establishments. Formerly, such professional services were not considered essential to obtain the most economical and practical plan, design and construction of factories. Today, with keen competition on every side, this attitude is completely reversed. Every wide-awake business concern insists upon engaging the best architectural advice in all these matters, realizing that to obtain the maximum in production and the utmost in skill their buildings must be treated architecturally.

One of the most notable and recent achievements in the application of these ideas is the factory building for the American Chicle Company, for which Ballinger & Perrot, now the Ballinger Company, Philadelphia and New York, are the architects and engineers. They not only designed the structure itself, but also the mechanical equipment. The building is located in Long Island City, occupying the entire block bounded by Thompson and Nelson avenues and Mount and Manley streets, and was erected by the Turner Construction Company of New York.

The principle façade on Thompson avenue is five stories in height above the basement, which is partly out of ground. The central tower, in which the house and sprinkler tanks are located, is 27 feet square and rises 75 feet above the main roof. The remainder of the building is four stories above the basement, which, owing to the grade of the side streets, is entirely out of ground on the rear streets, thereby giving the effect of a five-story building. The building is 200 feet wide by 600 feet long, having an interior court 40 feet by 380 feet, and contains 13 acres of floor space.

The exterior has been treated in a dignified manner, depending entirely on the careful adjustment of the fenestration for its pleasing relation of voids to solids. The arrangement, spacing and widths of piers have all been determined to give additional mass in the form of pylons at the corners of the building to offset the great length of the sides and to balance the central tower on the main façade. These pylons, containing stairs and elevators, form an adequate and pleasing termination which is ordinarily found lacking in the façades of industrial buildings where the end pier is usually nothing more than a repetition of other similar intermediate piers.

The meager use of ornament and the frank acceptance and expression of the structural members as such shows, on the part of the architects, a recognition of the limitations of the concrete itself and a thorough appreciation of its proper use in its application to the successful architectural treatment of a purely utilitarian structure where confined strictly to simplicity and economy of construction.

The entire design expresses good taste in its composition. The restraint with which ornamentation has been used in resorting to effects in low relief only, by the deliberate omission of projecting courses, cornices, etc., is highly commendable. Surface and color treatment has been obtained by bush-hammering certain portions and by the judicious use of colored tile inserts. In passing, attention should be called to the pleasing manner in which the straight line of the parapet top has been interrupted over the pylons and gracefully eased into the vertical lines of the central tower.

Increased experience in the use of concrete, improvements in the standardization of forms and methods resulting in greater economy and rapidity of construction, have all been factors in the selection of this type of construction in preference to all others. Reinforced concrete has been used througout; the floors and roof of the flat slab type without beams or girders, and supported on columns spaced 20 feet apart in each direction. The foundations are carried on concrete piles, numbering approximately six thousand, making one of the largest operations of this type in New York City.

The interior court, previously mentioned, not only furnishes the central portion of the building with an abundance of light and air, but also contains two railroad sidings, on either side of which are loading platforms, so that the handling of both the raw materials and the finished products takes place within the building itself, thereby eliminating the objectionable feature of having huge quantities of freight around the exterior of the building.

The incoming bales of raw material are conveyed to the roof by elevators or automatic conveyors, where it is stored in the open air and sprayed periodically to keep it moist. From there its transit through the building is so arranged that automatic gravity conveyors are used to handle the material between processes instead of by hand, so that every mechanical process takes place according to a definitely pre-conceived routing plan, from the arrival of the raw material to the departure of the finished product.

The government bonded warehouse in the basement, consisting of a large room in which dutiable raw materials are stored, is a feature of unusual interest. This room is connected with the top story of the building by automatic conveyors.

The power plant is located in the basement. Over the boiler room is placed the coal bunker, having gates spaced at regular intervals along the bottom, underneath which is a traveling coal weigh-larry, equipped with automatic scales for weighing and recording the amount of coal consumed by each boiler. An auxiliary basement coal storage has been provided at one side of the boiler room which is filled from coal cars on the siding of the interior court above. The stack foundation is combined with adjacent column footings and the stack itself is rigidly secured to each floor and roof.

A very elaborate system of air-conditioning has been installed by means of which the inside air, after being purified by washing, is maintained at both a constant temperature and humidity throughout the year. In the different departments these constants vary with the processes of manufacture involved, for certain of which the rooms have the ceilings insulated against temperature deviation by the use of cork, and the windows insulated against moisture and air leakage by means of double sash.

The central tower of the main façade with its concrete urns and balconies, rising 150 feet above sidewalk, is more than an architectural adornment. It performs the two-fold purpose of furnishing, first, an opportunity to advertise the business by means of a tile name panel on each side, near the top, thereby avoiding the usual objectionable, inartistic and expensive free-standing sign board; and secondly, of concealing the unsightly tanks, etc., which invariably disfigure the roof line of industrial plants. It contains a 65,000-gallon house tank which furnishes process water, and a 50,000 gallon gravity tank supplying the automatic sprinkler system of the building. This system of fire protection is supplemented by a fire pump located in the power plant, having a capacity of 1,000 gallons per minute with direct connection to the street water main, and completed by standpipes installed in the stair towers of the building which have hose connections at each floor and roof.

The public and private offices, waiting room, laboratory, etc., are located on the first floor either side of the main entrance on Thompson avenue, at the base of the tower. There is also, on this floor, a medical department consisting of waiting rooms, operating room, nurses' quarters and rest rooms. On opposite sides of the building there are separate entrances for men and women employes, each giving access to a waiting room, office, locker room furnished with individual sanitary metal lockers and a shower room with toilet facilities adjoining. Realizing the vital importance attached to the welfare of the employes as an essential part of the success of any modern industrial establishment, ample provision has been made in this respect by devoting the entire fifth floor facing Thompson avenue to this purpose. Here may be found rest rooms, men's smoking room, separate dining rooms for men and women, with a kitchen having a complete equipment of the most modern type. A portion of the main roof, opening from the dining rooms, has been enclosed in wire for recreational purposes.

The electrical plant is installed as two single unit equipments either one of which can be operated independently, an arrangement whereby the failure of any part of th transmission system does not affect the remainder of the plant. These substations, having the entire transformer equipment housed in thoroughly fireproof vaults, are located in the basement, occupying a floor area of approximately 3,000 square feet. While planned for a future ultimate capacity of 2800 Kv-a, the present plant consists of sufficient apparatus to take care of a combined power and lighting load of 1650 Kv-a. The alternating, high tension, three phase current delivered to the building is transformed, through the medium of two transformer substations, to a two phase potential of 220 volts for motive power and single phase, 220-110 volts, for lighting. The sub-stations, containing complete light and power distribution switchboards of the most modern type, are fed by a loop system on the high tension side, which is so installed as to constitute a safeguard against a shut-down of the plant through failure of the outside service.

The building is lighted throughout by high power Mazda lamps, provided with the most modern type of enamelled steel reflectors. In addition to the regular outside telephone service there is an interdepartmental system, a telecall system and an electrically supervised fire alarm system.

The electrical contractors for this building were J. Livingston & Co., Inc. The tile inserts were executed by D. H. McLaury Tile Co., Inc., and all the marble and slate work was done by Friedman Marble & Slate Works, Inc. The plumbing fixtures were manufactured by the J. L. Mott Iron Works and the monolithic cement floors were laid by the Builders Material Supply Co. The column forms were supplied by Deslauriers Column Form Co. The watchmen's clock system was installed by Newman Clock

Co., Inc., The Steelbilt toilet partitions were manufactured by Betz Bros., Inc. The W. G. Cornell Co. installed the plumbing, drainage and sprinkling systems.

The spirit of co-operation with which all those engaged in the construction of this building have been embued is a worthy tribute to the sincerity of purpose which has attended its design and construction. This is true, not only of the owners and the architects, but also of those who executed the work, to which the successful combination of beauty with utility in its practical execution is directly attributable, and emphasizes in the most forcible manner why "Industrial buildings should be designed architecturally."

REINFORCED CONCRETE OFFICE BUILDINGS

The great reinforced concrete structure, known as the Western Electric Company Building, covers the entire New York City block bounded by Hudson, West Houston, Greenwich and Clarkson Streets, an area 200x328 feet. It is designed for use for general offices by the Western Electric Company, Inc., and the New York Telephone Company.

The construction is of flat slab type with a column spacing of 20 feet center to center each way. The slab thickness is 8½ inches for the floors carrying 200 pound load. Deformed bars are used for reinforcement and the columns are round with the usual mushroom head characteristic of flat slab construction. The first floor is designed to carry a 350 pound live load, the second to eighth floors inclusive a 200 pound live load, the ninth a 100 pound load and the roof a 40 pound load. The interior walls are 8 inch brick and the exterior is finished with a brick veneer, with limestone and granite trim.

The Fletcher Building occupies a site having a frontage of 175 feet on Varick Street with a depth of 65 feet extending eastward on Grand and Watt Streets. This is an eleven story reinforced concrete structure with an exterior design following Gothic motifs. It is also of flat slab type with 9 inch slabs designed to carry 300 pound live loads throughout. The interior walls and partitions are of hollow tile.

The approximate quantities of material used in the construction of the Western Electric Company Building were 55,000 barrels of cement, 17,000 cubic yards of sand, 19,500 cubic yards of gravel, 500 cubic yards of grit and 2,100 tons of reinforcing steel. The material quantities for the Fletcher Building were 14,000 barrels of cement, 4,000 cubic yards of sand, 7,500 cubic yards of gravel and 450 tons of reinforcing steel. Both buildings were built by the Turner Construction Co.

The quantities given above are figured quantiites for sand and gravel. The aggregate actually used, known as Marlboro Aggregate, supplied by the Peconco Engineering & Contracting Corp., is specially prepared and has the following properties.

It consists of a graded mixture of crushed field stone, gravel and sand all from the same bank. The material is washed, screened and stored in separate bins for the 1½-inch, ¾-inch, ⅜-inch and ¼-inch sizes. The bins are fitted with valves through which the material is fed on to conveyor belts. A mixture corresponding to any specified grading may be prepared in quantity.

A mixture having a fineness modulus of 6.03 and voids of 23% consists of one part of material smaller than ¼ inch to two parts of material larger than ¼ inch and has the following properties:

Total retained on	Per cent.
100 mesh sieve	99.3
48 " "	96.9
28 " "	91.4
14 " "	82.9
8 " "	70.8
4 " "	64.8
⅜ " screen	61.3
¾ " "	32.9
1½ " "	2.6

A standard test on a mixture consisting of one part cement and five parts "Marlboro Aggregate" ratio by volume $\frac{\text{water}}{\text{cement}} = 0.82$, concrete cylinders, 8 inch x 16 inch at 28 days showed 2,813 pounds per square inch. The tensile strength of 1:3 cement mortar briquettes made from the material passing ¼ inch showed 115% to 140% of the strength of Ottawa sand, based on results from four independent testing laboratories.

McKenzie, Voorhees & Gmelin are the architects for the Western Electric Company's Building and Helmle & Corbett the architects for the Fletcher Building. J. P. Hall-Smith Company were the electrical contractors for the Western Electric Company's Building. H. G. Vogel Company supplied the automatic sprinkler equipment for this building. A. B. See Electric Elevator Company installed the elevators. Krider Building Material Co., Inc., supplied the builders' materials for both buildings.

TIMES SQUARE AND APOLLO THEATRES

The two new Selwyn theatres, the Times Square and the Apollo, both opened this winter, are very unusual in their decorative color schemes, offering novelty as well as harmony. The interior of the Times Square is Empire in style, worked out in silver, green and black. The walls are silver gray. The touches of green are so delicate in tone that they melt imperceptibly into the grays, and the tapestried orchestra seats continue the color harmony, all standing out in contrast to the background of the carpet, which is black and the curtain in folds of black velvet.

From the orchestra floor a grand stairway winds up to the mezzanine, off which lies the ladies' smoking and retiring room with its every convenience for women guests. The men's smoking and retiring room is in the basement. It is a beautiful Tudor room paneled with oak wainscoting and extremely inviting to the masculine element.

The color scheme of the Apollo is tan, rose and blue, the curtain of peacock blue velvet being the solid color note of the scheme. A feature of the decoration is a large mural painting by William Colton at the back of the auditorium.

The frontages of these new playhouses adjoin on Forty-second street. The auditorium of the Apollo is on Forty-third street, reached through a long lobby, the outer section of which is paneled with Rozato and Levanto marbles, while the inner part has a color scheme of black and white in Belgian marble.

The Apollo theatre has a seating capacity of 1,200.

One of the most important of the innovations, from the standpoint of the public, is the double doors and air cushions on the Forty-third street side, which makes the theatre practically sound-proof, protecting its audiences from the disturbing noises of the streets. Likewise the Apollo is the first "legitimate" playhouse in New York having what is termed the cross-over aisle in the balcony. This, in effect, is a series of entrances to the balcony, eliminating for ticket holders of that section of the house just half the distance they have to travel in any other playhouse of the same size in this city.

The Apollo stage is equipped with the counterweight system and large stage elevators, which make it possible to handle tremendous productions with the utmost ease. It also boasts an 80-foot general lounging room, in addition to commodious lounges and retiring rooms for the separate use of men and women.

Both houses were designed by Eugene DeRosa and built by the O'Day Construction Co. The Architectural Plastering Co., Inc., did the exterior scraffito work on the Times Square Theatre and the ornamental plaster work in both theatres. L. S. Fischl's Sons were the painters and decorators for the Times Square Theatre. The cove striplighting, stage plugging devices and the marquee lighting for both theatres were executed by the New York Calcium Light Co. The furniture was supplied by Smith & Jones. The interior marble work in both theatres was done by the G. Cullo Marble Works. The counter weight system of stage rigging was installed by Peter Clark, and the electric stage lifts by Charles E. Dowdall, Inc. Menger, Ring & Weinstein, Inc., supplied the display cases.

THE FISK BUILDING

The building being constructed for the Fisk Rubber Company occupies all of the southerly Fifty-seventh Street block front between Broadway and Eighth Avenue. It will replace two historical apartment house structures of the type popular in the city a quarter of a century and more ago—the Rutland, occupying the greater part of the centre of the block, and the St. Augustine on the Eighth Avenue corner. In addition, on the plot were two five-story flats on Eighth Avenue and a six-story business structure on the immediate Broadway corner.

The building will be the tallest north of the Times Square section, exceeding by five stories the United States Rubber Building on the Broadway and Fifty-eighth Street corner, which, when erected several years ago, towered above everything else in its vicinity. The Fisk Rubber Company will control the entire structure under a long-term lease, occupying large space for its executive offices and leasing the remainder to tenants in the automobile and allied industries.

There will be setbacks, in accordance with the zoning law, at the upper stories, giving a pleasing tower-like effect. The facade will be of brick and limestone and from the fifteenth to the twentieth story will be a row of massive columns. The first story will have the unusual height of 21 feet and the second story, to be devoted to stores, will be fourteen feet in height.

The site lies across the boundary of two height restriction districts set by the New York Zoning regulations. It is divided between the districts which restrict the height of the structure to 1½ times and 2½ times the width of the street between building lines without setback. An appeal was made to the Zoning Commission for a modification of the restrictions on the basis of the prominence of the building architecturally. To follow the regulations exactly would have produced an unsymmetrical structure which would have been an eyesore in a prominent location. The restriction was waived in this case and the setback for the entire building raised to the higher limit zone, but to offset this a setback at the rear of the building was made, leaving the space equivalent in the building volume about the same as if the zoning rule had been exactly followed, thus the owners do not reap any financial benefit from the modified ruling as the floor area of the building is not increased.

Carrere & Hastings and R. H. Shreve are the architects of the building and Fred T. Ley & Company are the builders. The construction cost is figured at $2,500,000. Richards-Wilcox Mfg. Company have the contract for the "Ideal" elevator door hangers, the miscellaneous iron work is being executed by Sexauer & Lemke, and the steel inspection is being made by Robert W. Hunt & Company. The Atlantic Terra Cotta Co. have the contract for the terra cotta work.

THE ATLANTIC AND PACIFIC STEAMSHIP COMPANY'S BUILDING

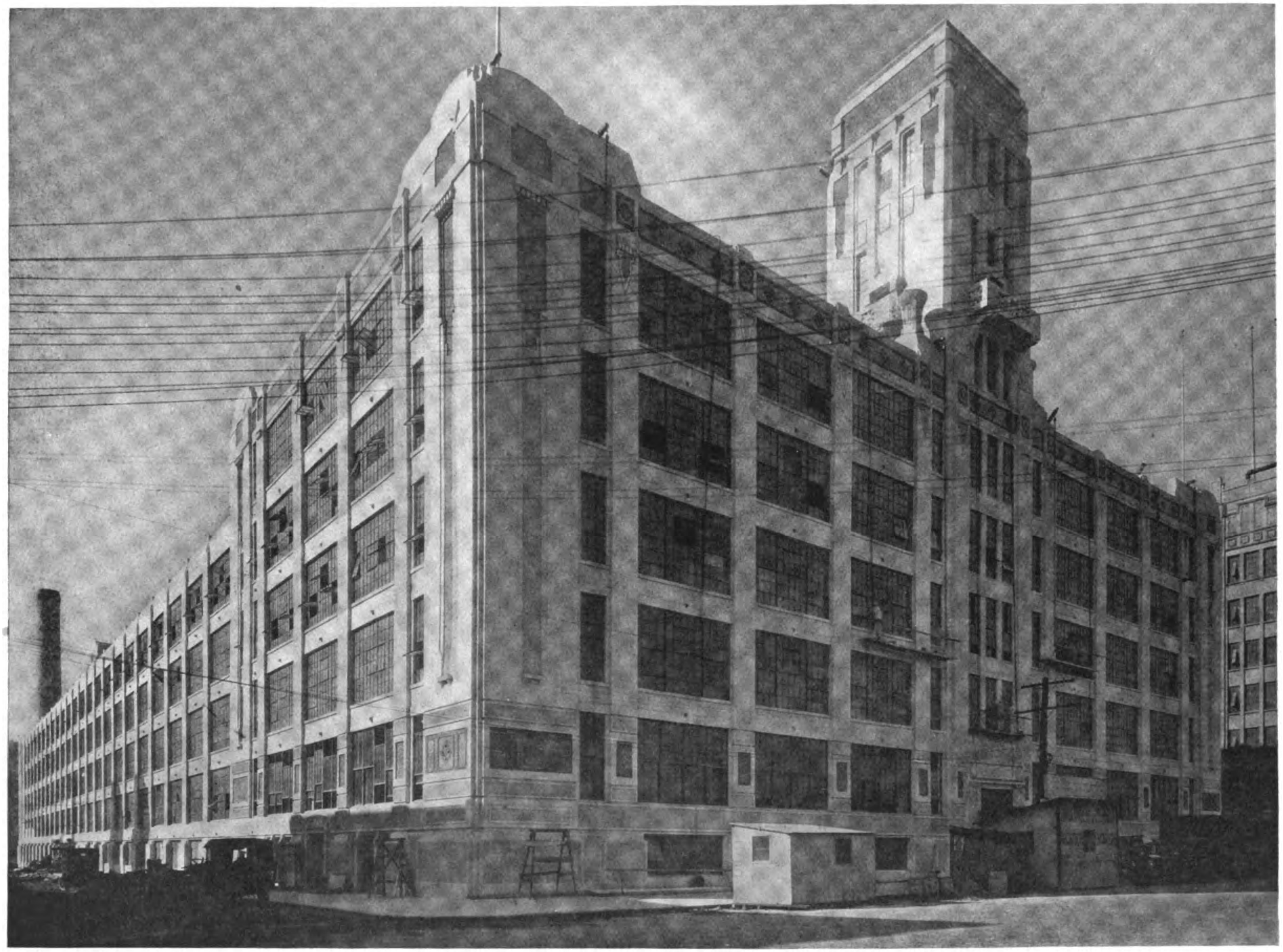
Well-designed small buildings are somewhat more infrequently met with than good larger ones. Perhaps this is merely a matter of percentage, as small buildings are put up in very considerable numbers, and it must be said for the most of them that they are merged in the commonplace to such an extent that most of us do not realize that they are ugly. Good small buildings, when they are built, are generally talked about and people even take the trouble to go and see them. We think that the little building we are now illustrating is worth seeing. Its red brick and white marble exterior has a mellowness and its iron balconies are attractive.

On the main floor there is a large public room with counters either side from the entrance and an elevator at the end of the public space. The colonial style chosen for the exterior is followed within and in the second story, where the general and private executive offices are located, there is one room with a good fireplace and all the feeling of a good American colonial interior. The third and fourth stories are occupied by the freight and claim departments respectively. The planning and division of floor space is, of course, adapted to the special needs of the business organization which occupies it. The arrangement and relation of offices is that which best suits a shipping business and the requirements of the owner in particular.

James W. O'Connor designed the building and the Whitney Company built it. Alfred E. Joy Co., Inc., did the painting and decorating.

Docteur Ernest Gautier, Art Director of the New York Foreign Export Bureau, has lately arrived from the Paris Office, bringing with him some handsome tapestries and other art materials. These will be very interesting to the architectural profession.

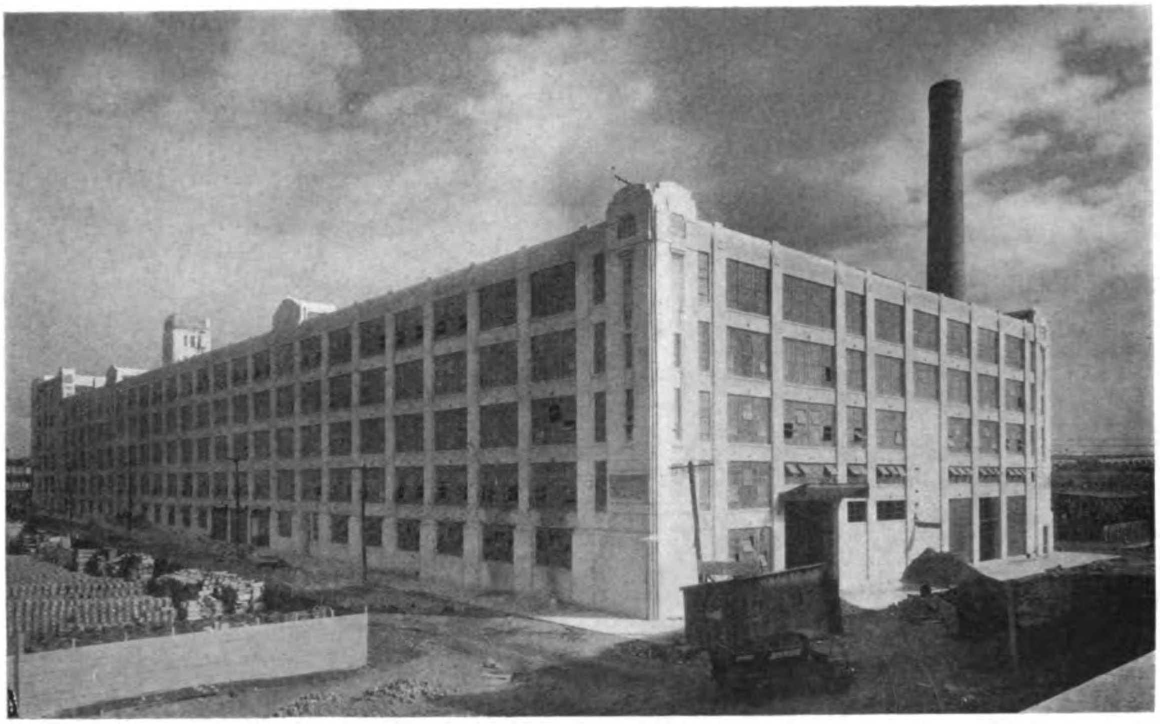
The New York Office of this firm is located at 105 Hudson Street.

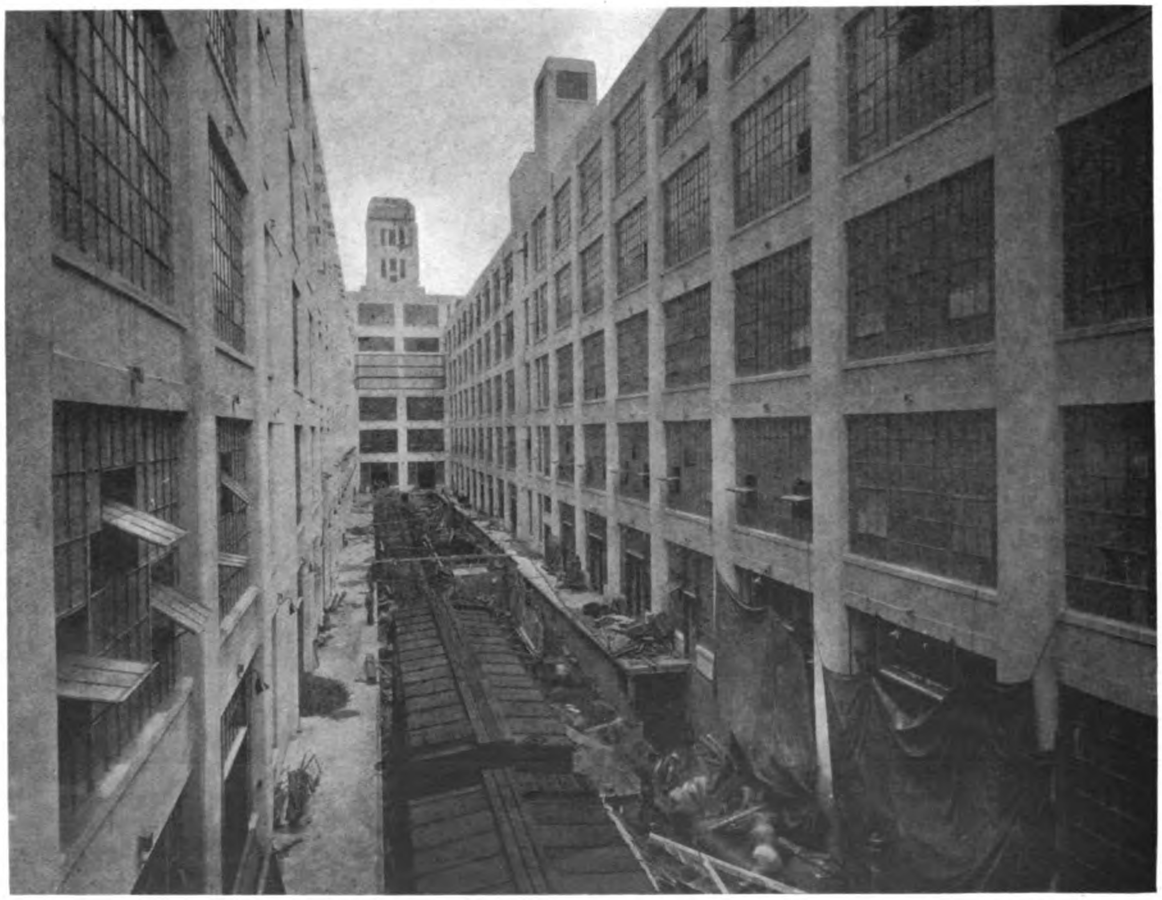


ARCHITECTURE AND BUILDING. Plate 139.

Built by Turner Construction Co.; electrical contractors—J. Livingston & Co., Inc.; Faience tile work—D. H. McLaury Tile Co., Inc.; marble and slate—Friedman Marble and Slate Works; plumbing fixtures—The J. L. Mott Iron Works; plumbing, drainage and sprinkling systems—W. G. Cornell Co.

AMERICAN CHICLE CO.'S BUILDING, LONG ISLAND CITY. N. Y.
Ballinger & Perrot, Architects and Engineers.

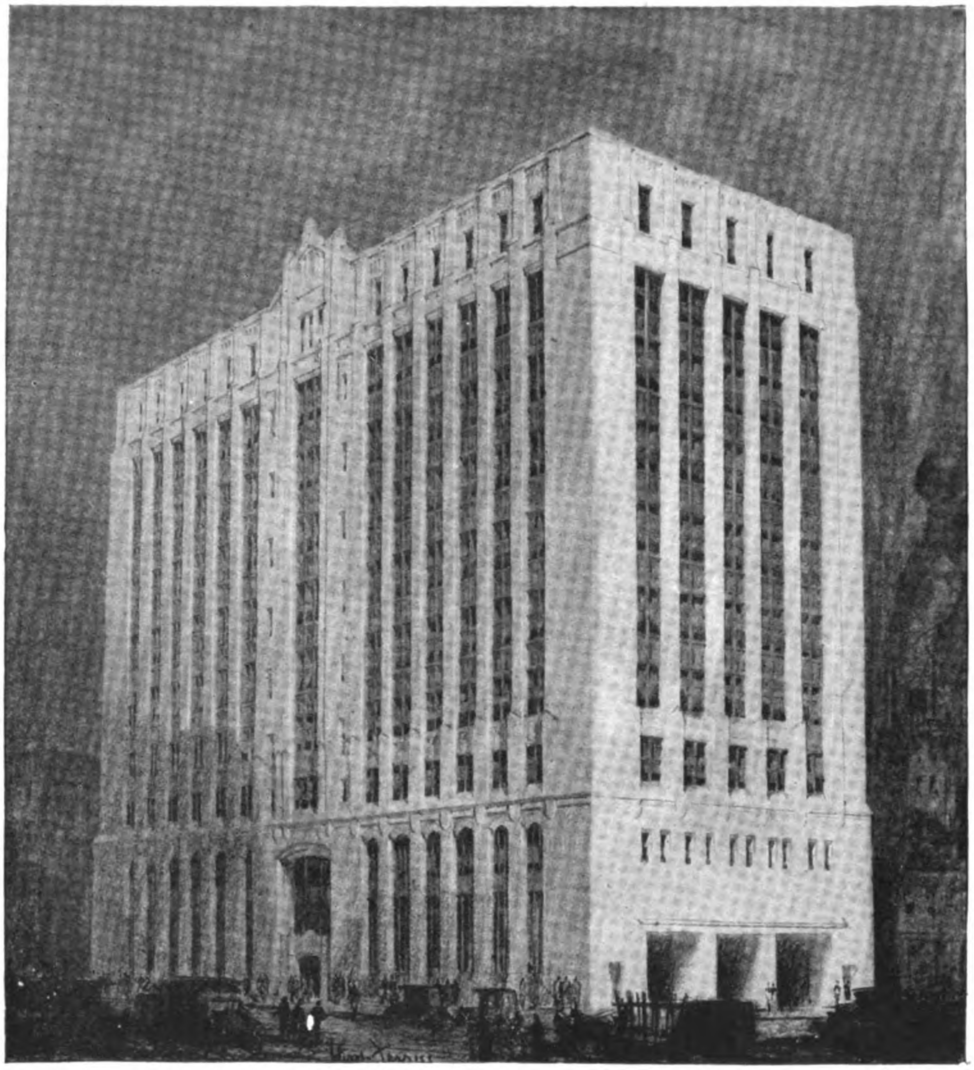




AMERICAN CHICLE CO.'S BUILDING, LONG ISLAND CITY, N. Y.
Ballinger & Perrot, Architects and Engineers.

ARCHITECTURE AND BUILDING. Plate 140.

Built by Turner Construction Co.; concrete floor finish installed by Builders Material Supply Co.; column forms—Deslauriers Column Mould Co.; steel toilet partitions—Betz Bros., Inc.; watchman's clock system—Newman Clock Co., Inc.

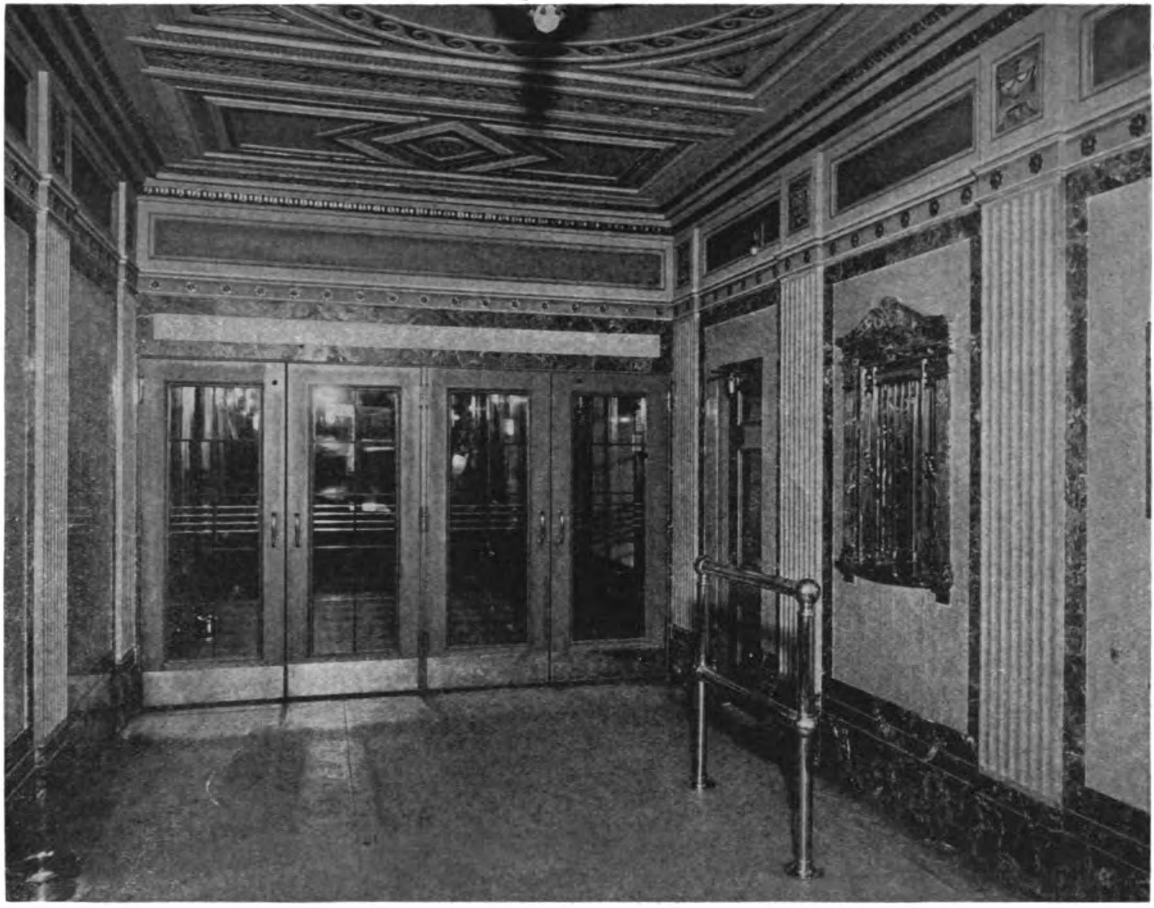


FLETCHER BUILDING, VARICK, GRAND AND WATT STREETS, NEW YORK CITY.

Helmle & Corbett, Architects.

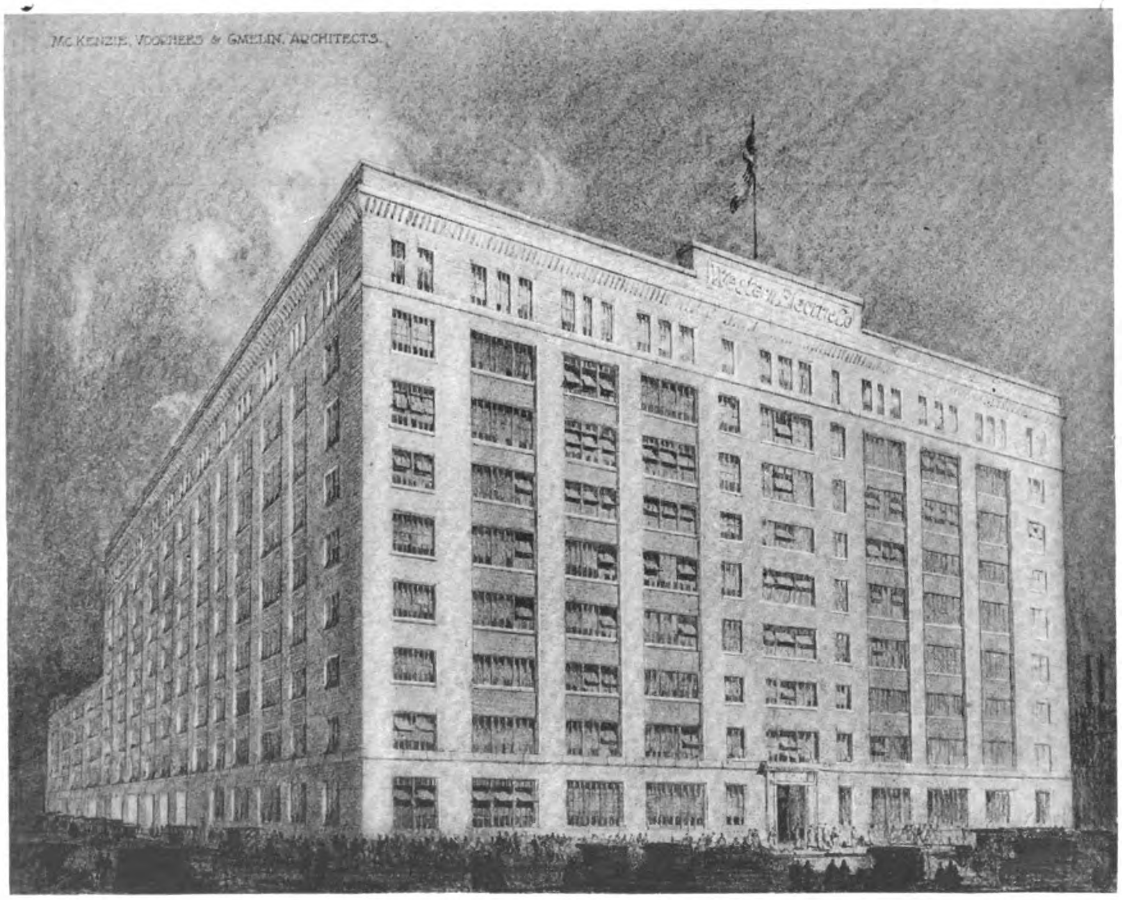
ARCHITECTURE AND BUILDING. Plate 141.

Built by Turner Construction Co.; excavating—Peconco Engineering & Contracting Corp.; agate aggregate—Agate Sand & Gravel Co.; builders' materials Krider Building Material Co., Inc.



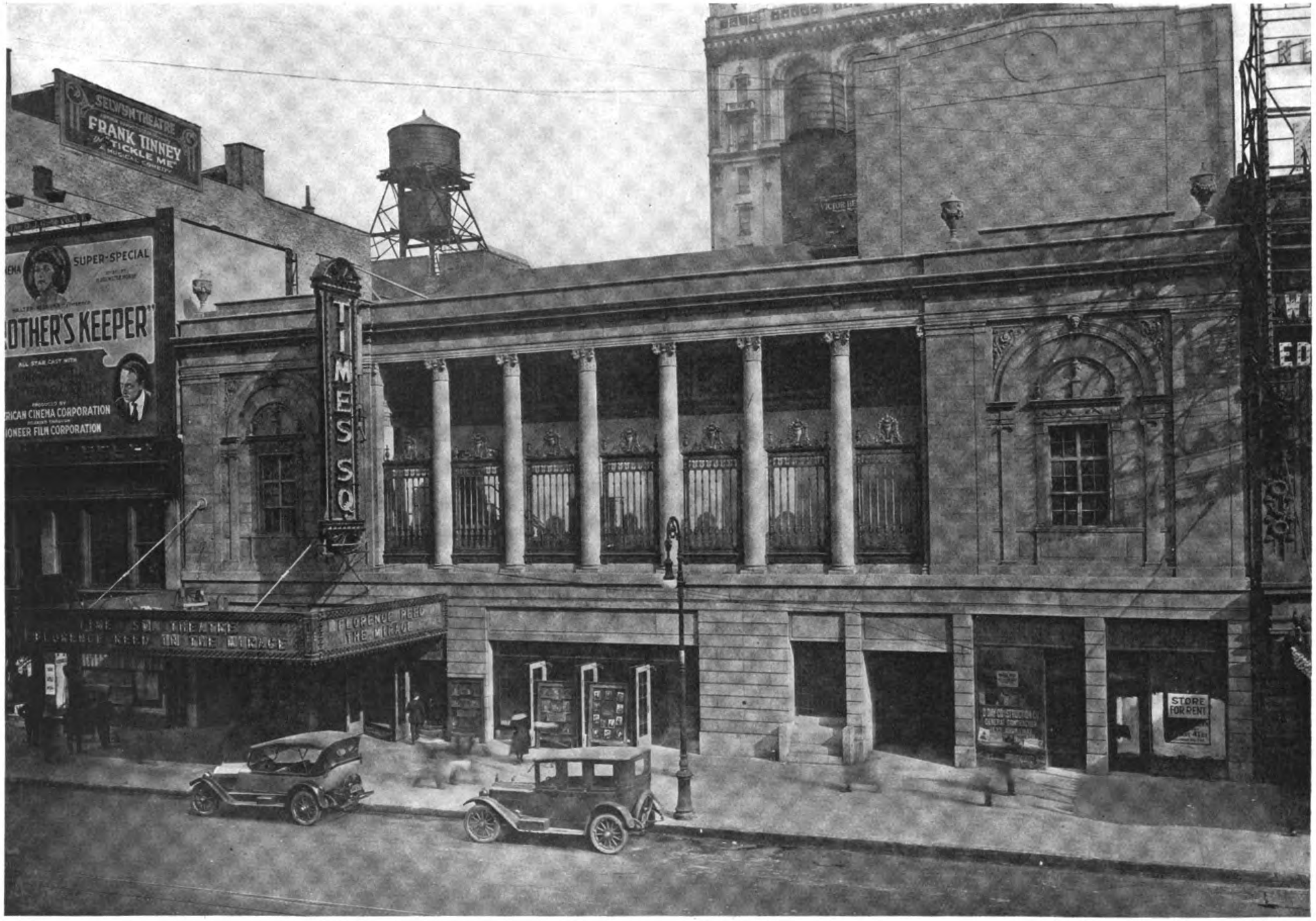
Interior marble—G. Cullo Marble Works.

LOBBY, APOLLO THEATRE.
Eugene De Rosa, Architect.



WESTERN ELECTRIC CO.'S BUILDING, HUDSON, WEST HOUSTON, GREENWICH AND CLARKSON STREETS, NEW YORK CITY.
McKenzie, Voorhees and Gmelin, Architects.

Built by Turner Construction Co.; electrical contractors—J. P. Hall-Smith Co.; automatic sprinkler equipment—H. G. Vogel Co.; builder's materials—Krider Building Material Co., Inc.; agate aggregate—Agate Sand & Gravel Co.; elevators—A. B. See Electric Elevator Co.

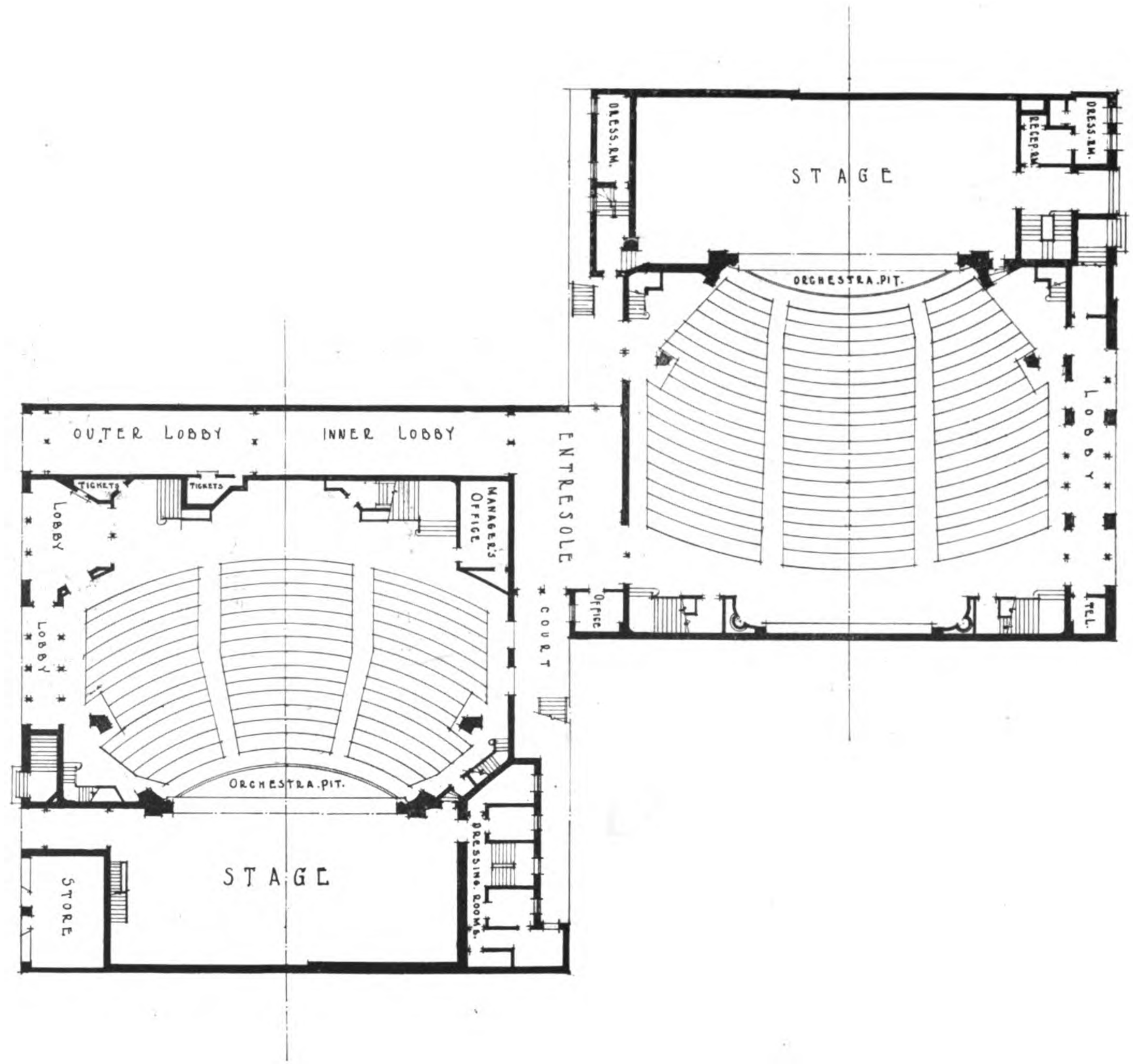


Architecture and Building. Plate 143.

Built by O'Day Construction Co.; display cases—Menger, Ring & Weinstein, Inc.; electric stage lifts—Charles E. Dowdall, Inc.; counter weight system of stage rigging—Peter Clark; marquee lighting—New York Calcium Light Co.; scraffito work—Architectural Plastering Co.; plumbing—W. G. Cornell Co.

TIMES SQUARE AND APOLLO THEATRES, WEST 42nd STREET, NEW YORK CITY.

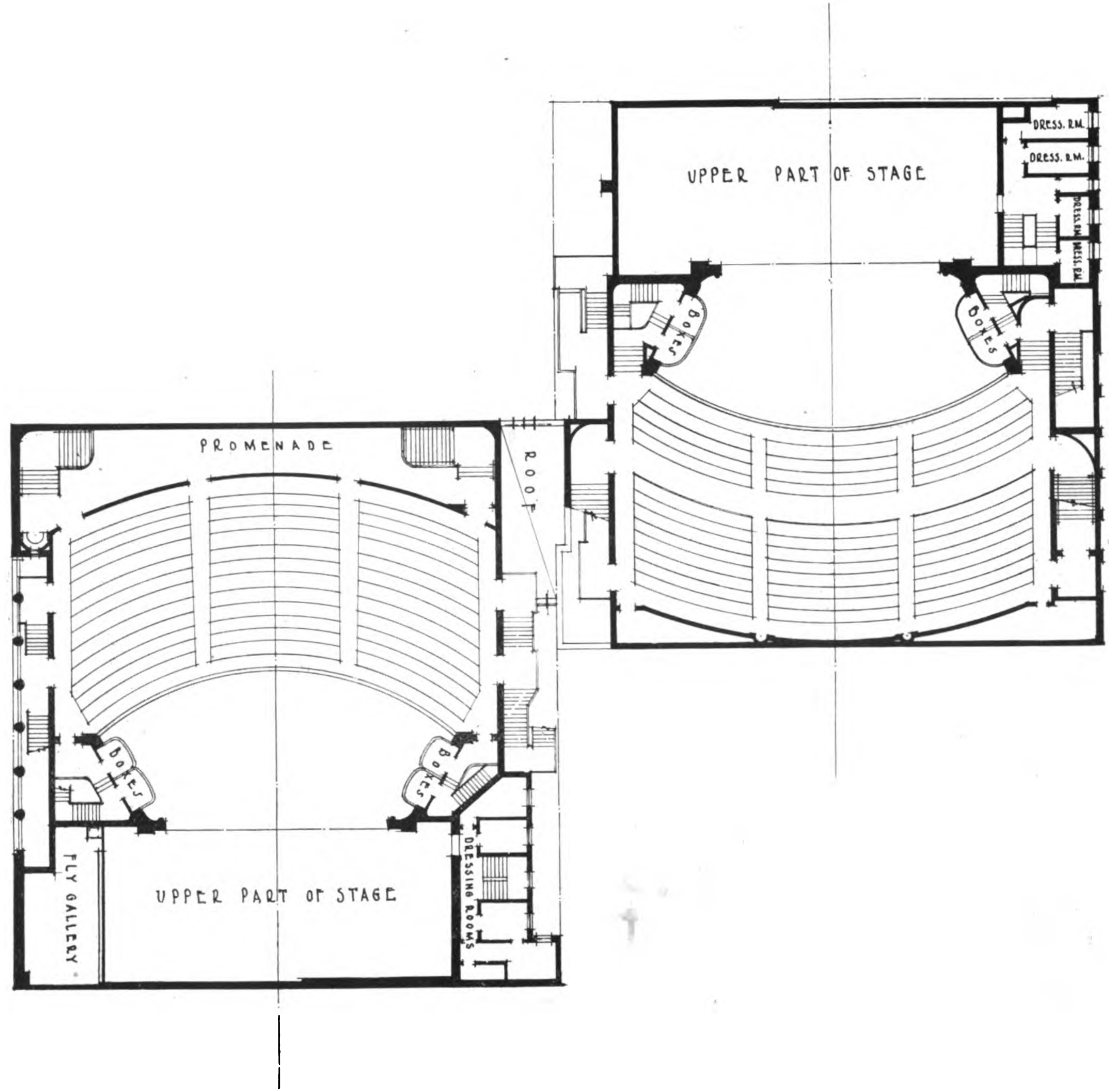
Eugene De Rosa, Architect.



ARCHITECTURE AND BUILDING. Plate 144.

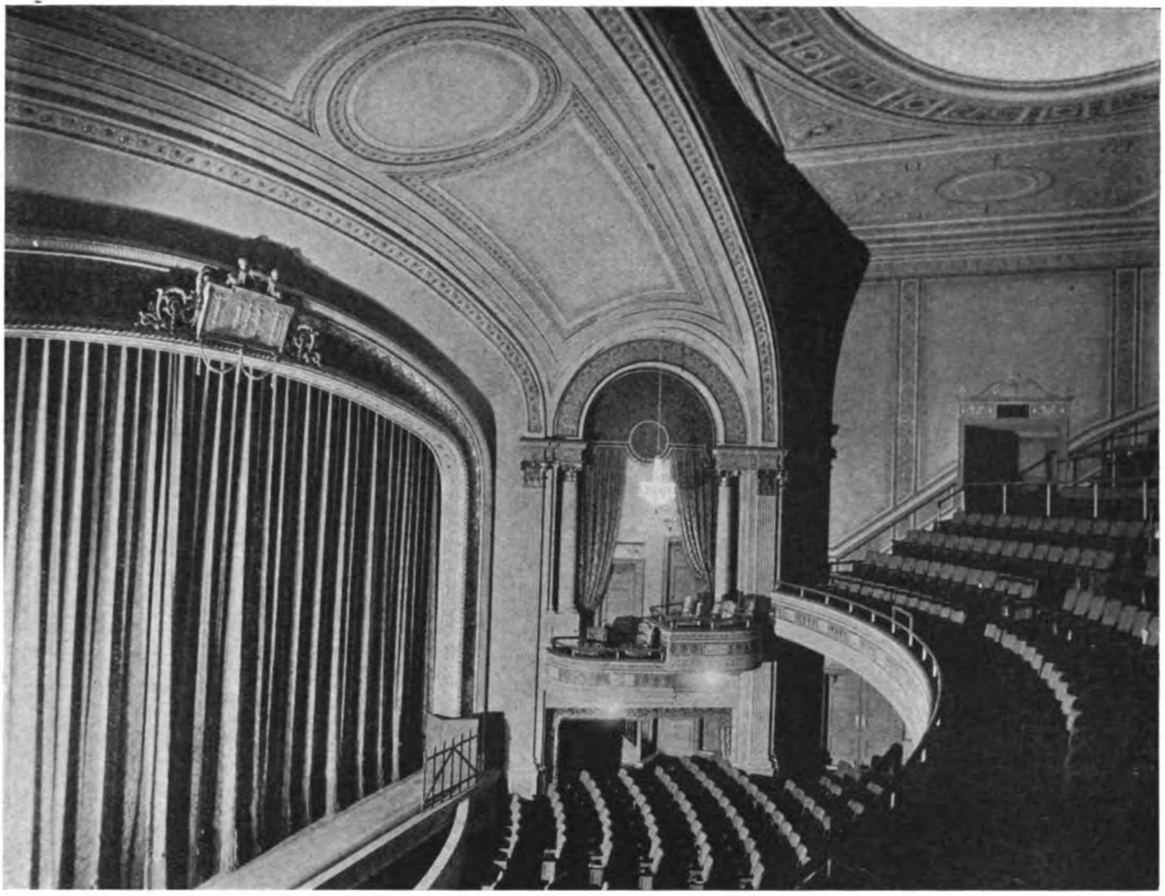
FIRST FLOOR PLAN, TIMES SQUARE AND APOLLO THEATRES, WEST 42ND STREET, NEW YORK CITY.

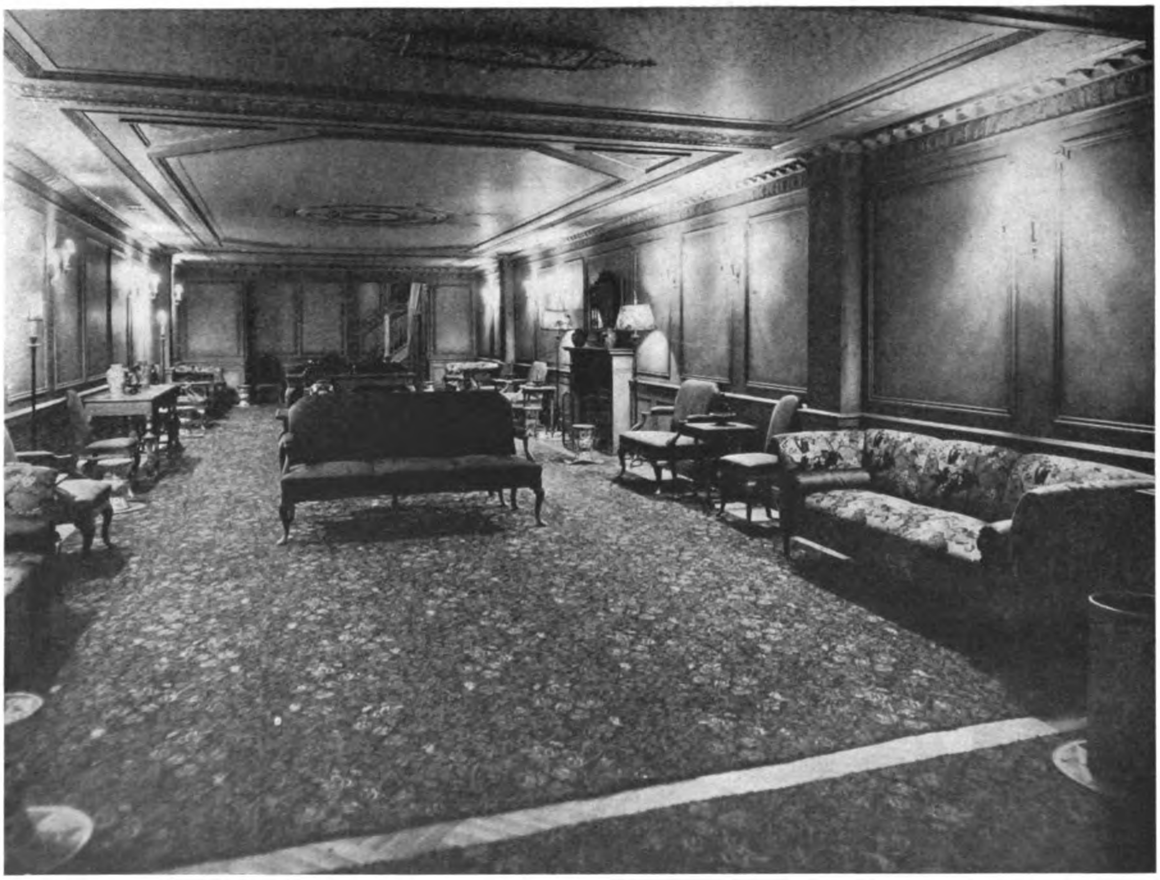
Eugene De Rosa, Architect.



SECOND FLOOR PLAN, TIMES SQUARE AND APOLLO THEATRES, WEST 42ND STREET, NEW YORK CITY.

Eugene De Rosa, Architect.



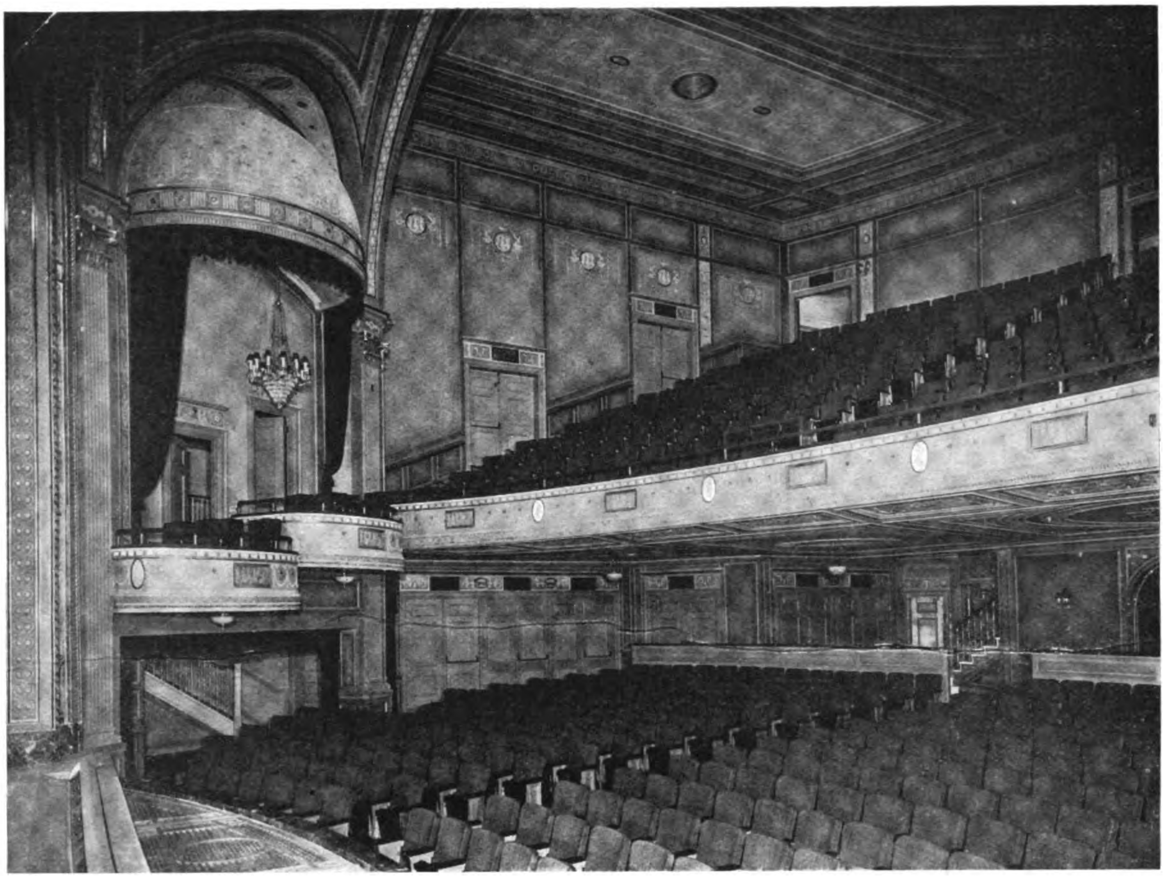


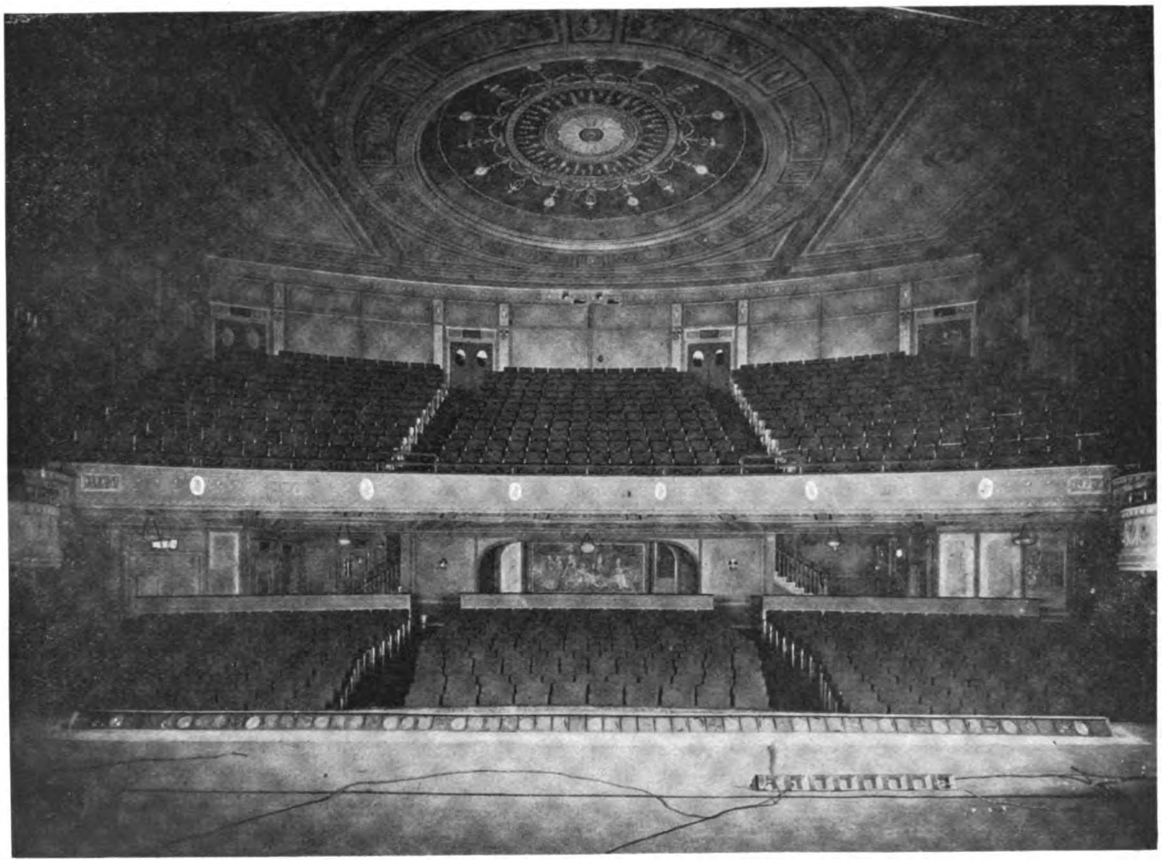
AUDITORIUM AND LOUNGE, APOLLO THEATRE, WEST 42ND STREET, NEW YORK CITY.

Eugene De Rosa, Architect.

ARCHITECTURE AND BUILDING. Plate 146.

Built by O'Day Construction Co.; furniture—Smith & Jones; ornamental plaster —Architectural Plastering Co., Inc.; painting—L. S. Fischl's Sons.; cove strip-lighting, stage plugging devices—New York Calcium Light Co.

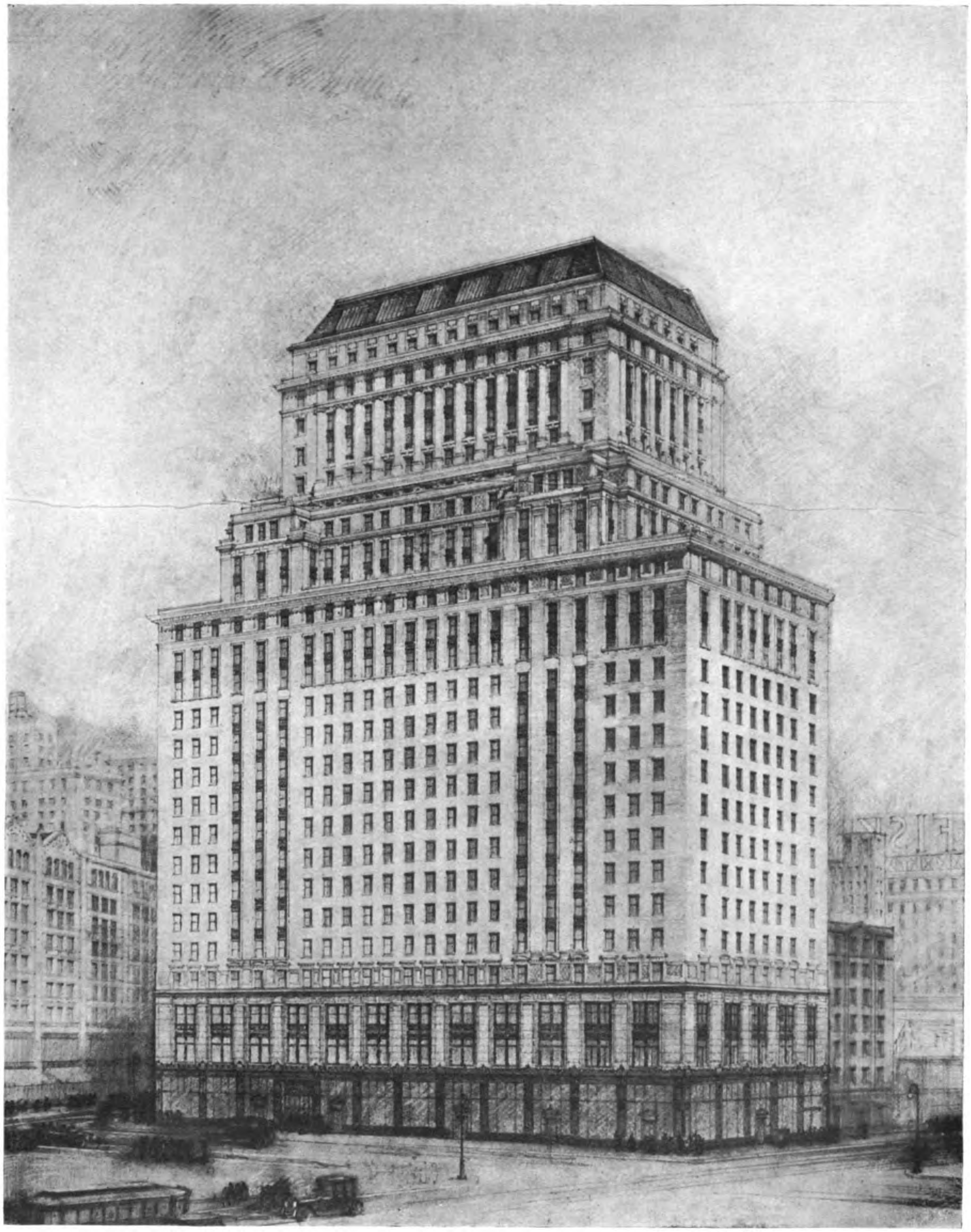




TIMES SQUARE THEATRE, WEST 42nd STREET, NEW YORK CITY.
Eugene De Rosa, Architect.

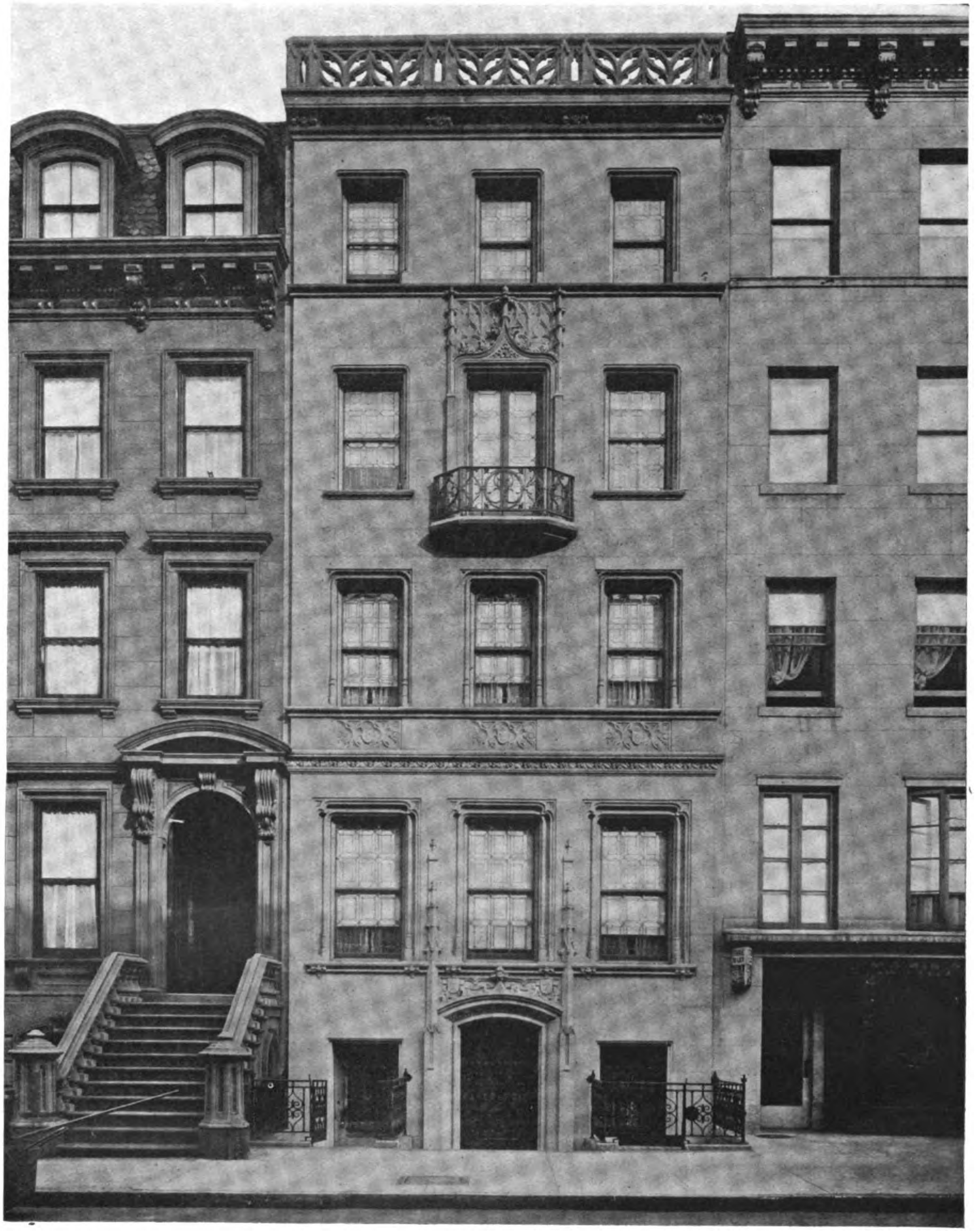
ARCHITECTURE AND BUILDING. Plate 147.

Built by O'Day Construction Co.; ornamental plaster work—Architectural Plastering Co., Inc.; painting—L. S. Fischl's Sons; furniture—Smith & Jones; interior marble—G. Cullo Marble Works; cove striplighting, stage plugging devices—New York Calcium Light Co.



FISK BUILDING, 1767 BROADWAY, NEW YORK CITY.
Carrere & Hastings and R. H. Shreve, Architects.

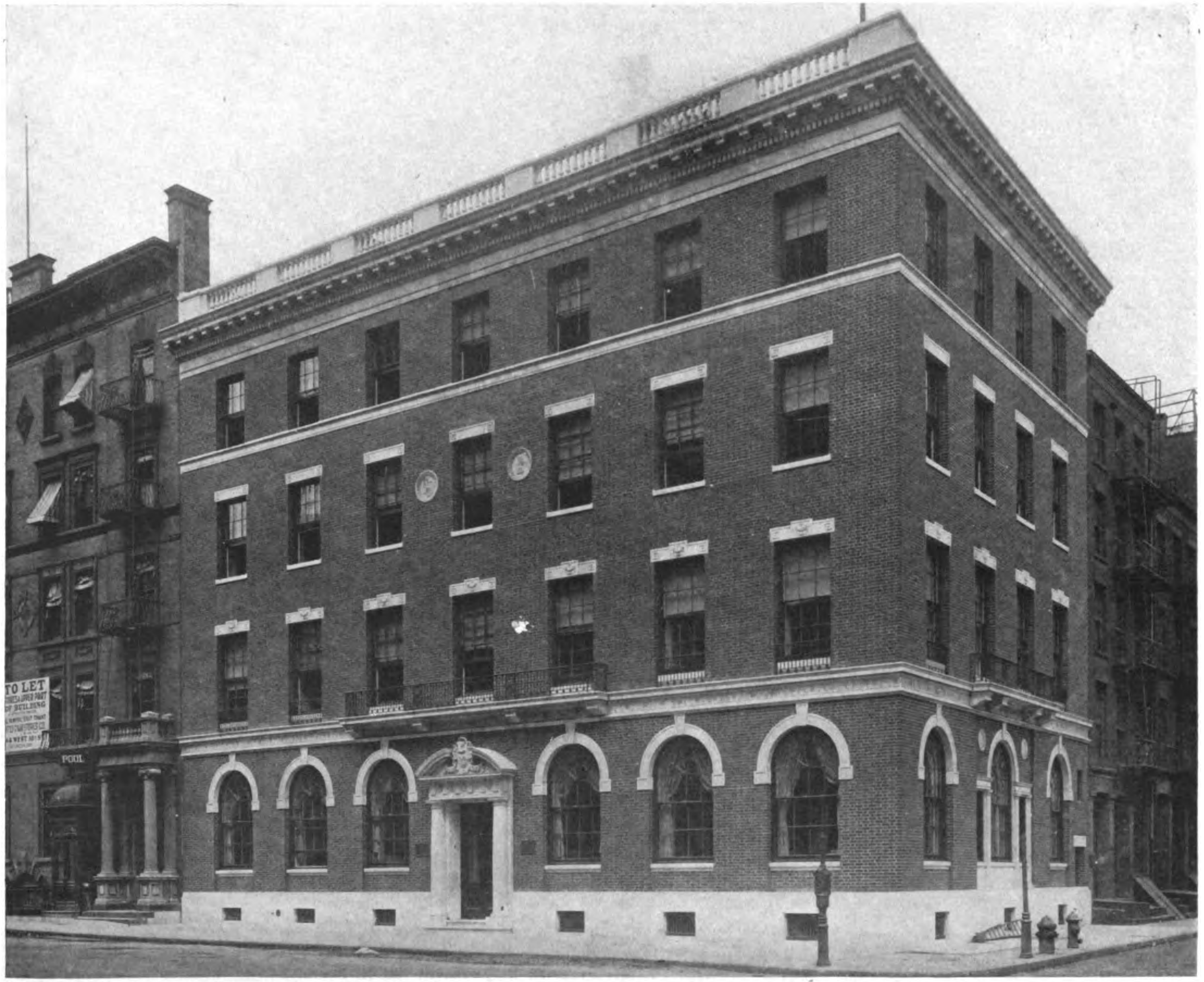
ARCHITECTURE AND BUILDING. Plate 148.
Built by Fred T. Ley & Co., Inc.; terra cotta—Atlantic Terra Cotta Co.; "Ideal" elevator door hangers—Richards-Wilcox Mfg. Co.; steel inspection—Robert W. Hunt & Co.; miscellaneous iron works—Sexauer & Lemke.



RESIDENCE OF MR. BURTON S. CASTLES, 33 WEST 47TH STREET, NEW YORK CITY.

Charles E. Birge, Architect.

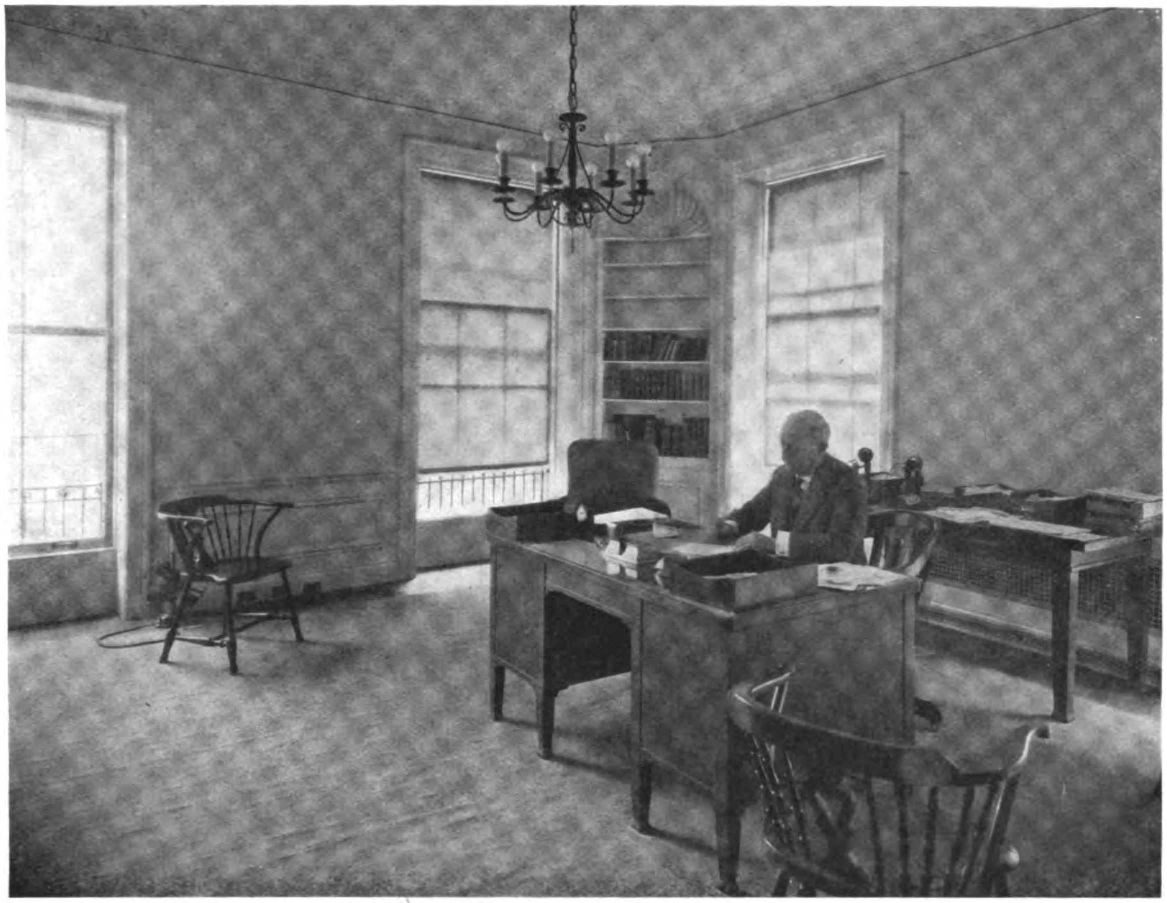
Architecture and Building. Plate 149.
Built by John H. Deeves & Bro.; furniture—Schleich Studios; ornamental plaster and stucco work—Jacobson & Co.



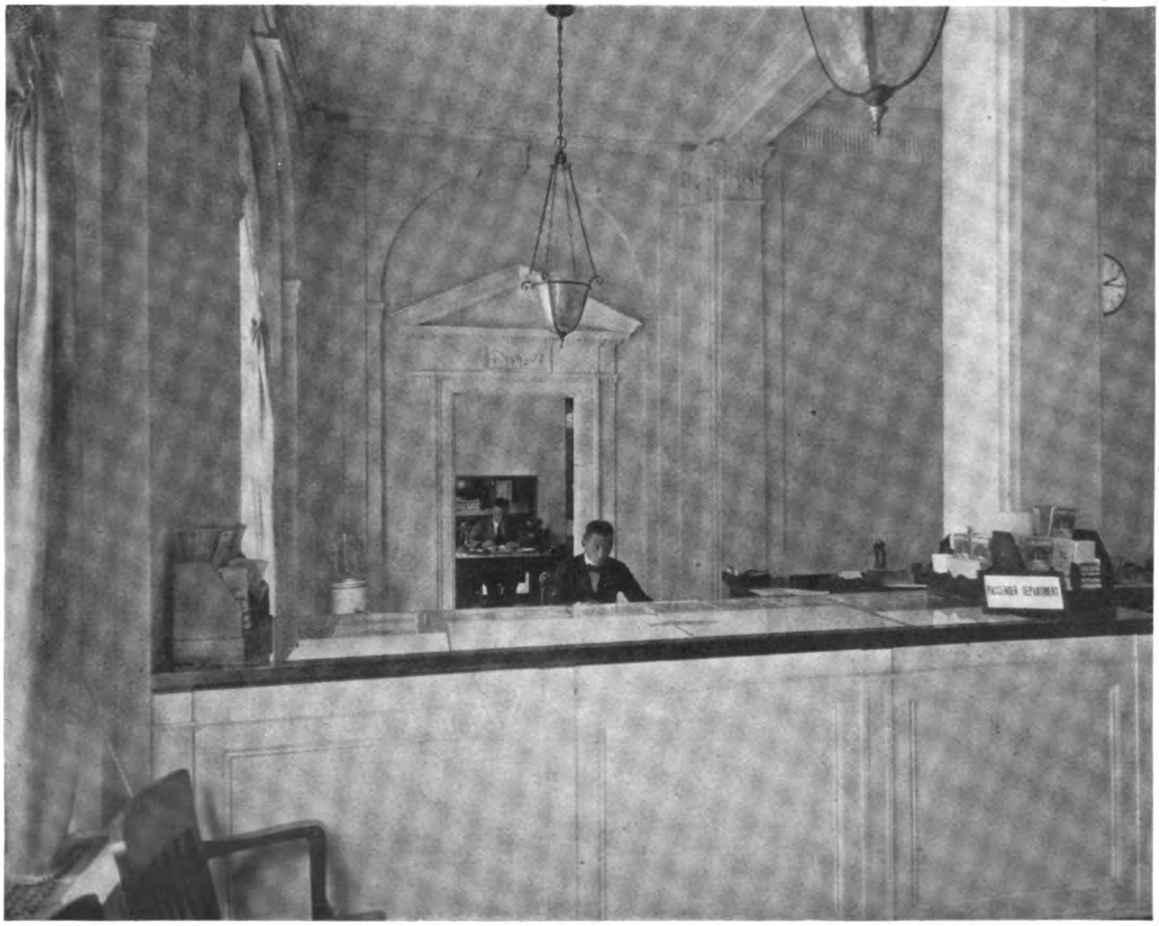
ATLANTIC AND PACIFIC STEAMSHIP CO.'S BUILDING, HANOVER SQUARE AND WATER STREET, NEW YORK CITY.

James W. O'Connor, Architect.

Architecture and Building. Plate 150.
Built by The Whitney Co.



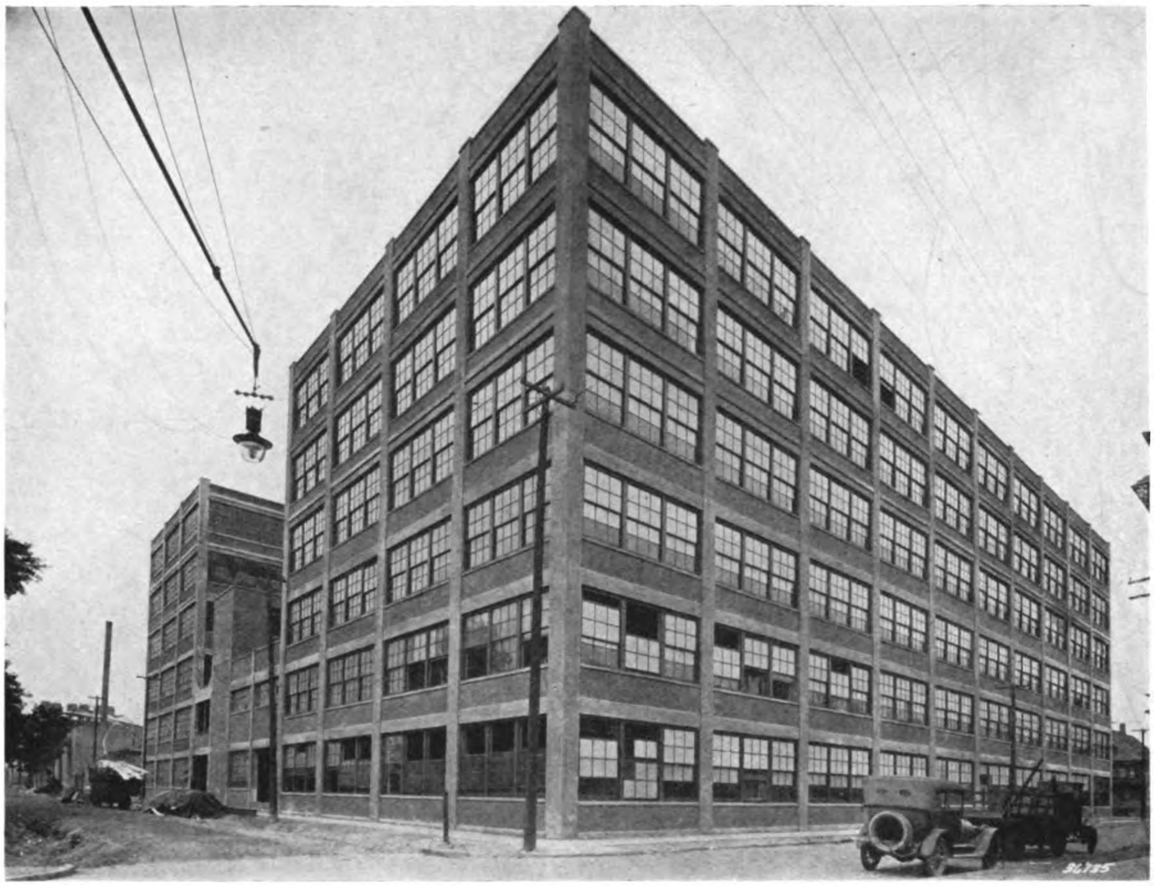
PRESIDENT'S ROOM



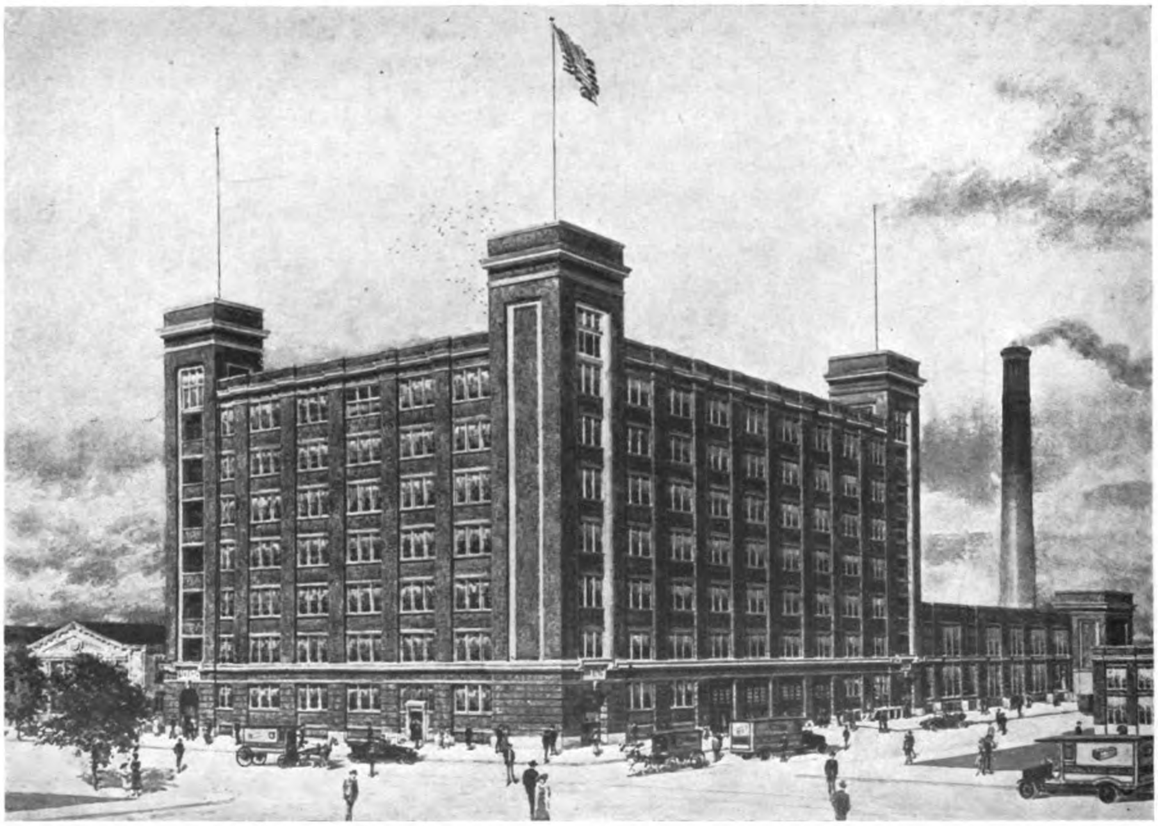
PASSENGER DEPARTMENT, FIRST FLOOR, ATLANTIC AND PACIFIC STEAMSHIP COMPANY'S BUILDING, HANOVER SQUARE AND WATER STREET, NEW YORK CITY.

James W. O'Connor, Architect.

ARCHITECTURE AND BUILDING. Plate 151.
Built by The Whitney Co.; painting and decorating—Alfred E. Joy Company, Inc.



FISHER BODY CO.'S BUILDING, DETROIT, MICH.
Louis Kamper, Architect.



NATIONAL BISCUIT CO.'S BUILDING, DETROIT, MICH.
A. G. Zimmerman, Architect.

ARCHITECTURE AND BUILDING. Plate 152.
Built by George A. Fuller Company; terra cotta work—Atlantic Terra Cotta Co.; painting—W. P. Nelson Co.

Book Reviews

HENDRICKS' COMMERCIAL REGISTER OF THE UNITED STATES FOR BUYERS AND SELLERS. 29th Edition. New York, S. E. Hendricks' Company, Inc. Cloth, 7 x10 inches, 2572 pages. Price $12.50.

It is difficult to find new words of praise of Hendricks' Commercial Register as it appears year after year, always with some improvement to add to its usefulness. Familiar with its growth for more than a quarter of a century the present volume occasions a retrospect of some of the early editions. It has grown in volume vastly and with its growth it has recorded the great increase in business in the United States over the same period and the wonderful expansion in specialized products applicable to construction and engineering.

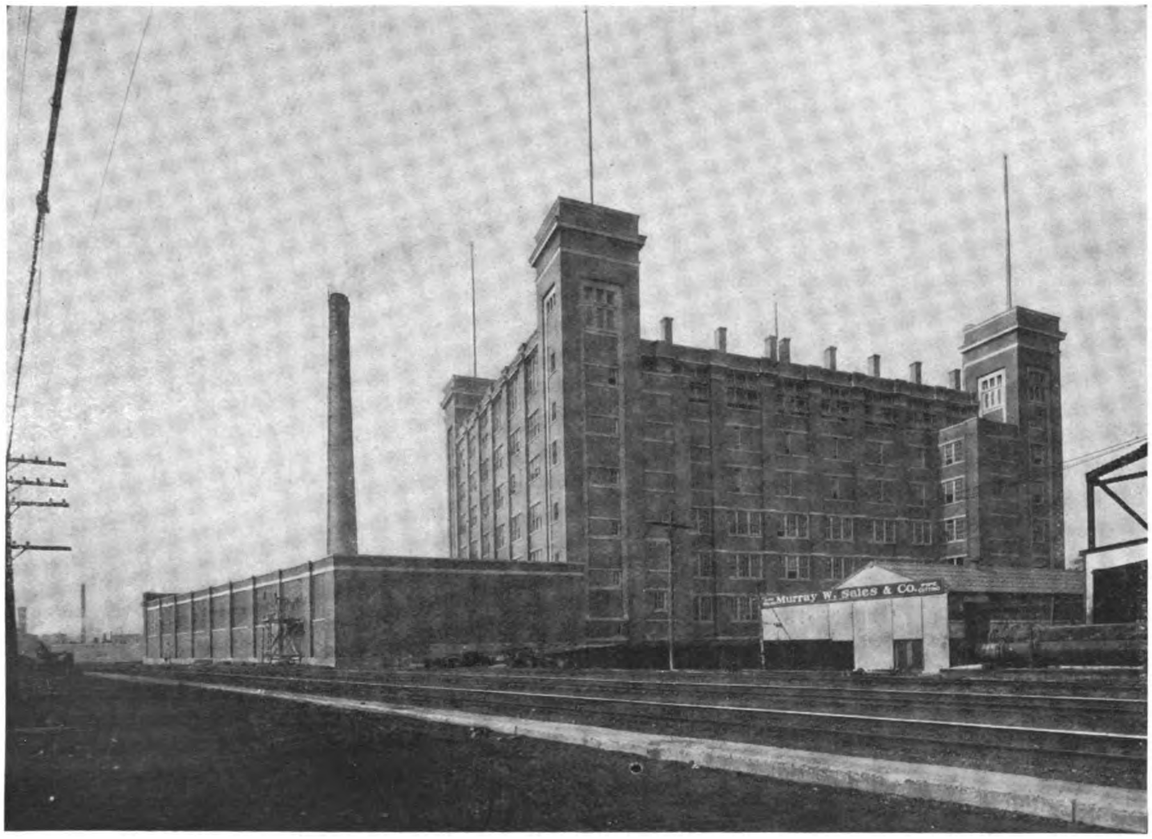
This year's edition has a page of instructions, "How to Find Information," which explains the use of the five main divisions of the book: Index to Trades, Classified Trades, Trade Names, Alphabetical Index and Advertisers' Index. In the great reorganization of business following the war so many changes have taken place and are still going on that only by means of such a book can a business house have readily available all concerns which now manufacture any article it may require or which are possible users of its products. The experience of the publisher has shown that many former sources of supply are no longer available while many new ones have arisen, and the same is true of outlets for the completed product.

The lists for buyers and purchasing agents are grouped under headings represented in the index by about 48,000 classifications and specialize minutely in the different products. The lists for sellers include architects, automobile builders, brick manufacturers, canners, contractors, machinery manufacturers, steam fitters supplies and many other lists of great importance to sellers. Many lists are arranged by states so the seller can readily select the part of the country he desires to cover.

Completeness and correctness are most essential to such a work and every effort is made throughout the year to maintain the highest standards in these respects. Users of the former editions know the value of the book and its large circulation throughout the construction field is the proof of its value.

INDUSTRIAL HOUSING. By Morris Knowles. New York, McGraw-Hill Book Company, Inc. Cloth, 6x9 inches, 408 pages, 54 figures, price $5.00.

Architecturally, the housing subject has been rather frequently and often effectively treated. The design of the houses themselves has been the predominant phase presented with somewhat here and there on town planning from the landscape architect's viewpoint. The engineer's side of the housing problem has had less promotion, although there has been scattered literature of much interest. This new book presents a volume of facts and statistics which will be of great value to those contemplating a housing development and enable them to figure it much more comprehensively in their preliminary estimates. There is relatively little in the book on house



NATIONAL BISCUIT COMPANY'S BUILDING, DETROIT, MICH.

designs and planning, but a great deal on the creation of the community as a whole with all its facilities. Quoting the introduction, "It is certainly apparent that homes alone, however attractive, will never supply a complete town. It is prerequisite to consider these and the whole town in relation to others in the vicinity; also the appropriate planning of streets, blocks and lots; parks and recreation facilities; the utilities, such as drainage, sewerage, water supply, gas and electricity; transit and transportation; health and sanitation."

The first chapters cover an historical review of the subject, fundamental preliminary consideration with some general cost estimates and methods of organization and financing. The following chapters cover selection of site, development of town plan, streets and pavements, water supply, sewerage and drainage, collection and disposal of town wastes, gas and electric service, houses and other types of buildings required, administration and supervision of construction and management and operation of the completed town.

The creation of the town and its facilities is distinctly the function of the civil engineer, and the author has brought together in this book a mass of data from many sources which particularly fills the needs of the town planner and constructor. His chapters on the service and utility requirements are exceptionally full of detailed information, much of which is not readily accessible to the average designer and which makes the book most valuable. It supplements the current literature in the field and is quite necessary to any library on this subject.

Current Notes

THE WESTERN ELECTRIC COMPANY'S EMPLOYES' CAFETERIA

The new building of the Western Electric Company, at Hudson and Greenwich streets, New York, is a fine example of the modern industrial building, safe, convenient, sanitary. There is every evidence that as much thought has been devoted to the comfort of the workers as to the production of Western Electric goods.

The employes' cafeteria, for instance, is fitted with every appointment to make for the health and happiness of the people who will use it. The tables and chairs have been wisely chosen for their cleanly appearance and their durability. They were furnished by the Reischmann Company.

White glass topped tables sparkle immaculately, and so well made are they that they will retain their cheerful appearance under the hardest wear. Durable bentwood chairs complete the equipment.

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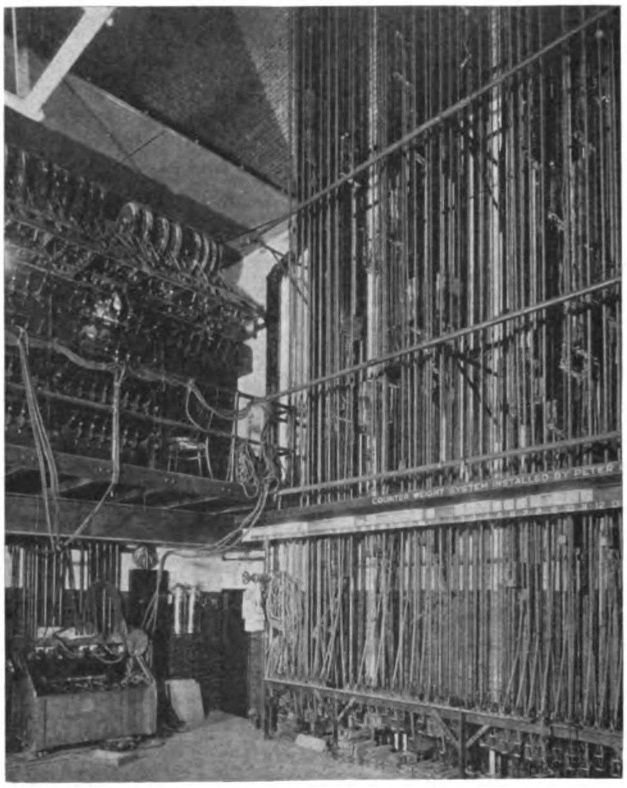
The stage equipment as installed in the Times Square and Apollo theatres, has many added advantages over the old style rope stage equipment as operated from the fly galleries. The new counterweight system does away with the construction of the fly galleries, as the scenery is suspended on steel cables and pipe battens, and is operated from the stage floor. The scenery is all indexed on an electric strip light and in the above theatres one man operates sixty sets of counterweights. In operating the counterweight system from the stage floor and from the prompt side of the stage and in connection with the switchboard, this also does away with an expensive signal system to the fly galleries as the stage director can speak directly to both the electrician and the man operating the curtain and the counterweight system. This system not only hangs scenery quicker and better than the old method, but is also a great labor-saving device.



COUNTERWEIGHT SYSTEM IN THE APOLLO THEATRE.

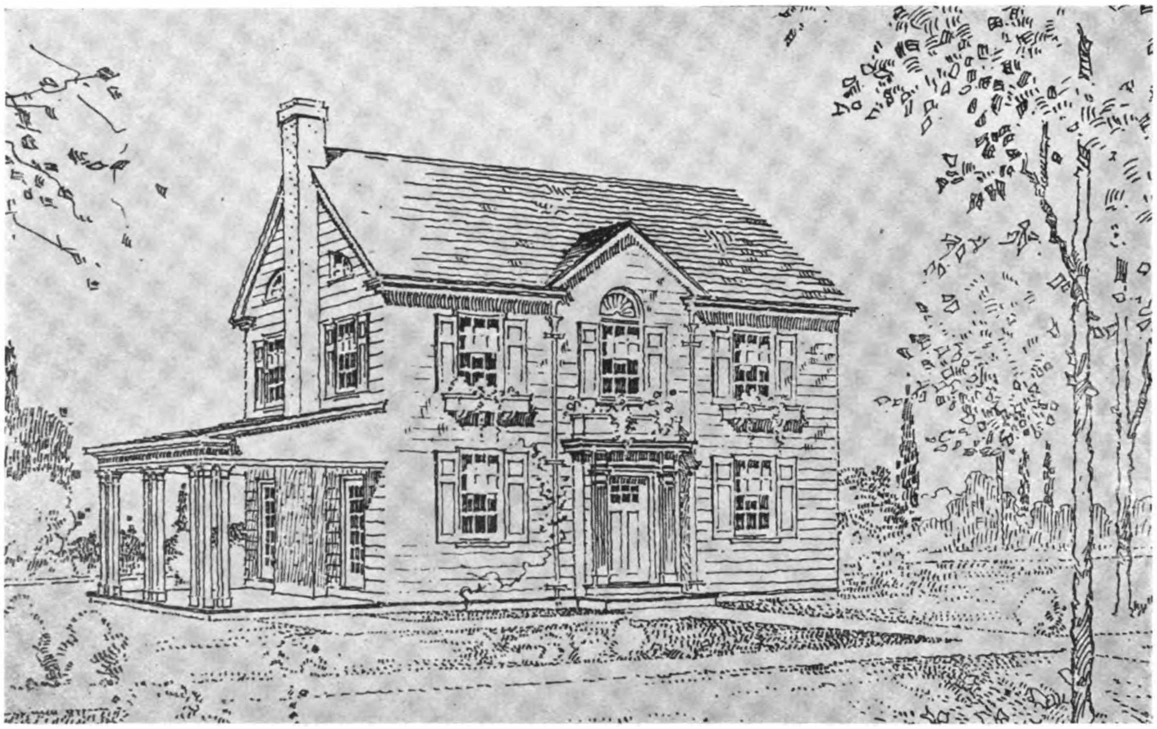
This equipment was installed by Peter Clark.

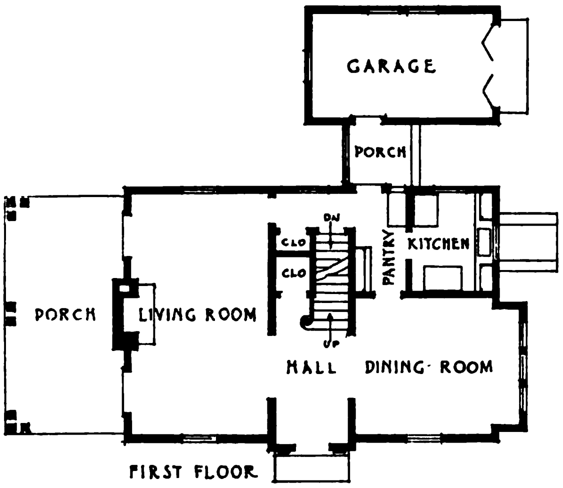
PRIZES AWARDED BY NATIONAL ARTS CLUB

At a dinner given January 4th to the painter and sculptor life members by the Board of Governors of the National Arts Club, 15 Gramercy Park, New York City, two prizes were announced for the Annual Prize Members' Exhibition, which opened January 5th in the National Arts Club Galleries, 119 East 19th street. George Bellows received first prize, $600 and a gold medal, for his painting, "Old Lady in Black." The second prize, $400 and a club medal, was presented to Frank DeHaven for his painting, "Moonlit Stream."

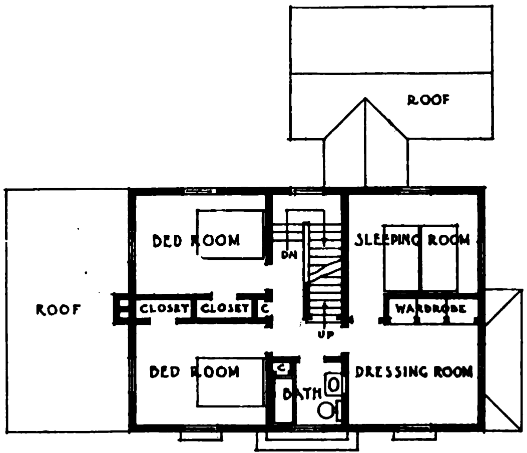
Fourteen new life members, eight of which were

(Continued on page 20—Advertisement)





FIRST FLOOR



SECOND FLOOR

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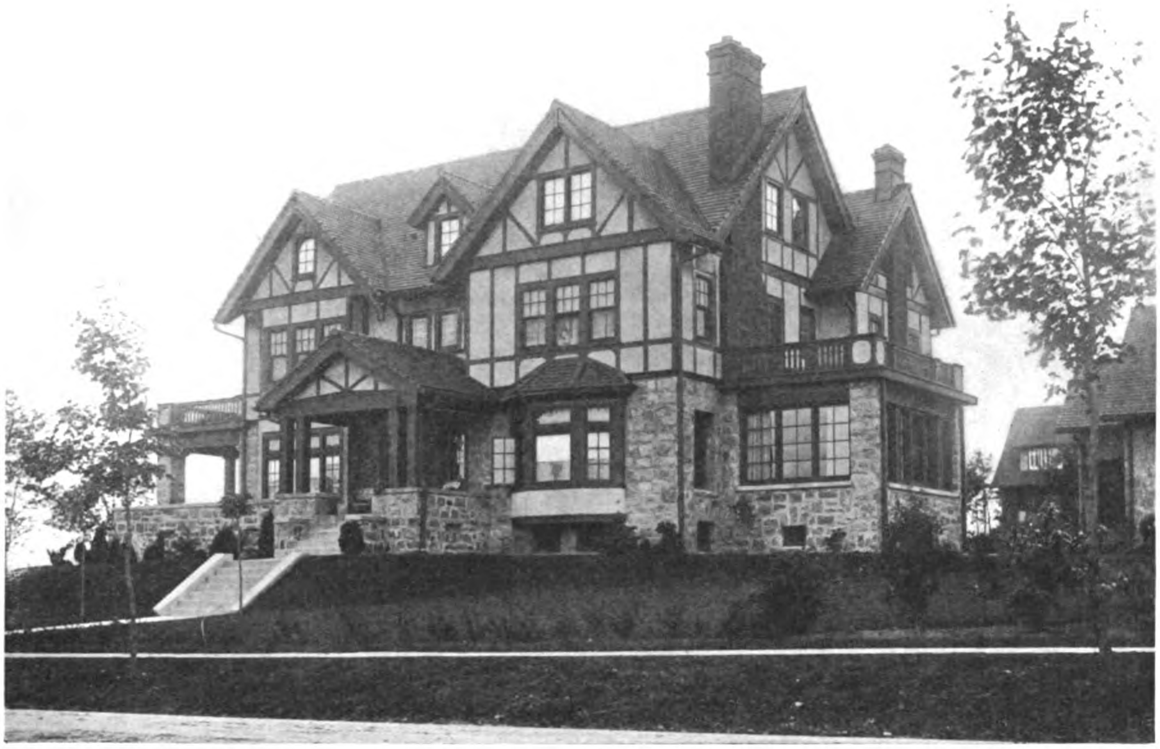
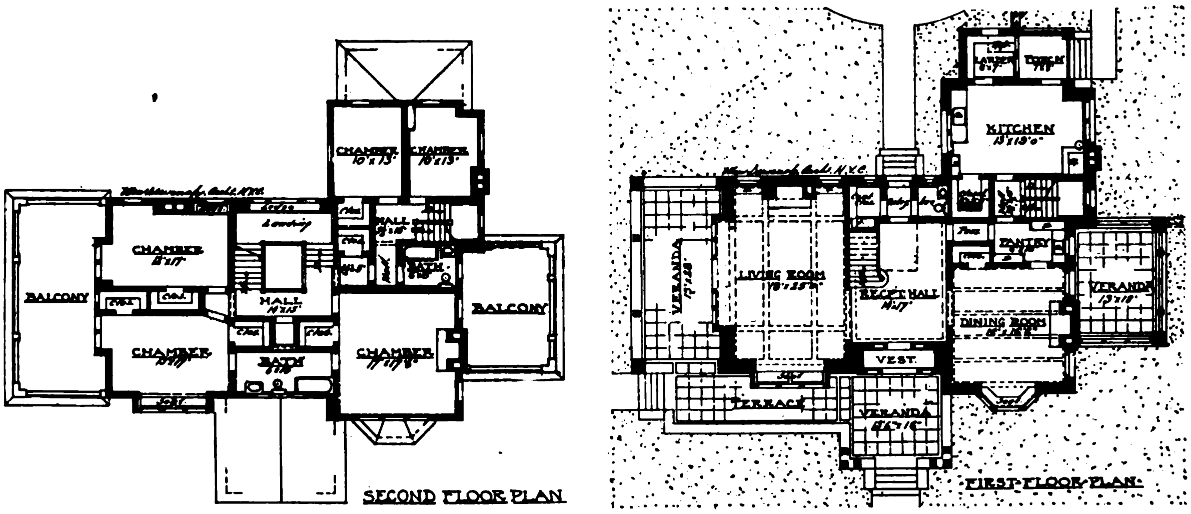
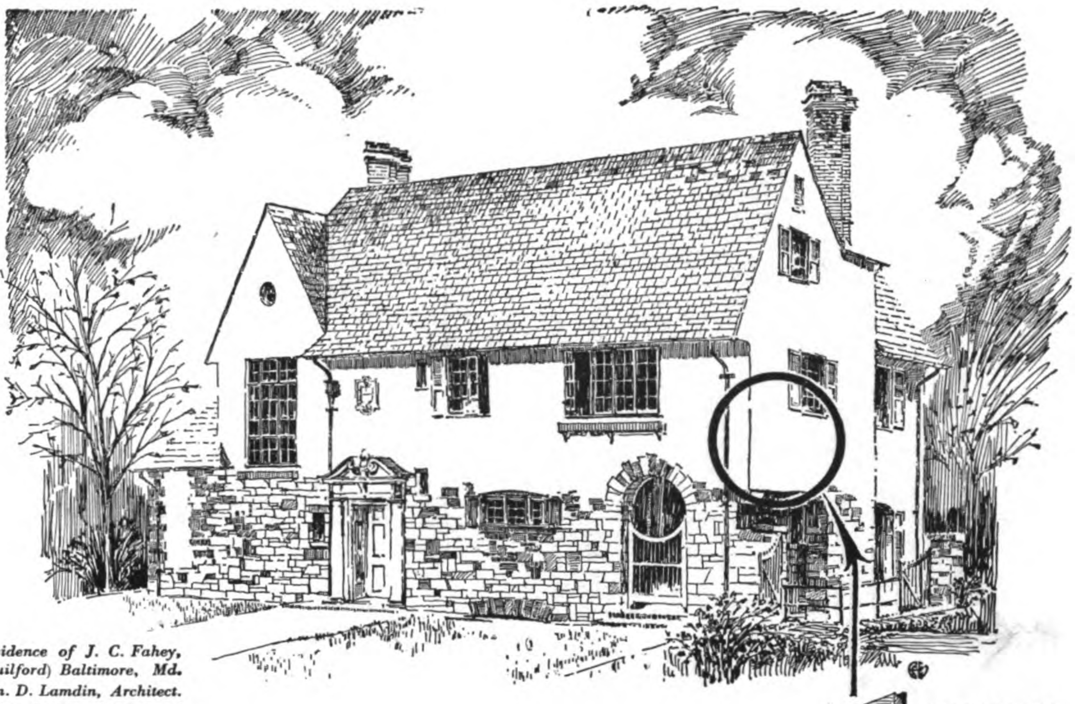


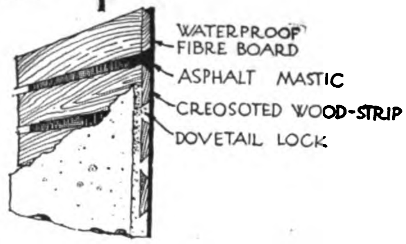


HOUSE OF ELIZABETHAN STYLE—GRANITE AND WHITE STUCCO CONSTRUCTION.

William Dewsnap, Architect.



Residence of J. C. Fahey,
(Guilford) Baltimore, Md.
Wm. D. Lamdin, Architect.
Bishopric Stucco Board used
on Exterior.



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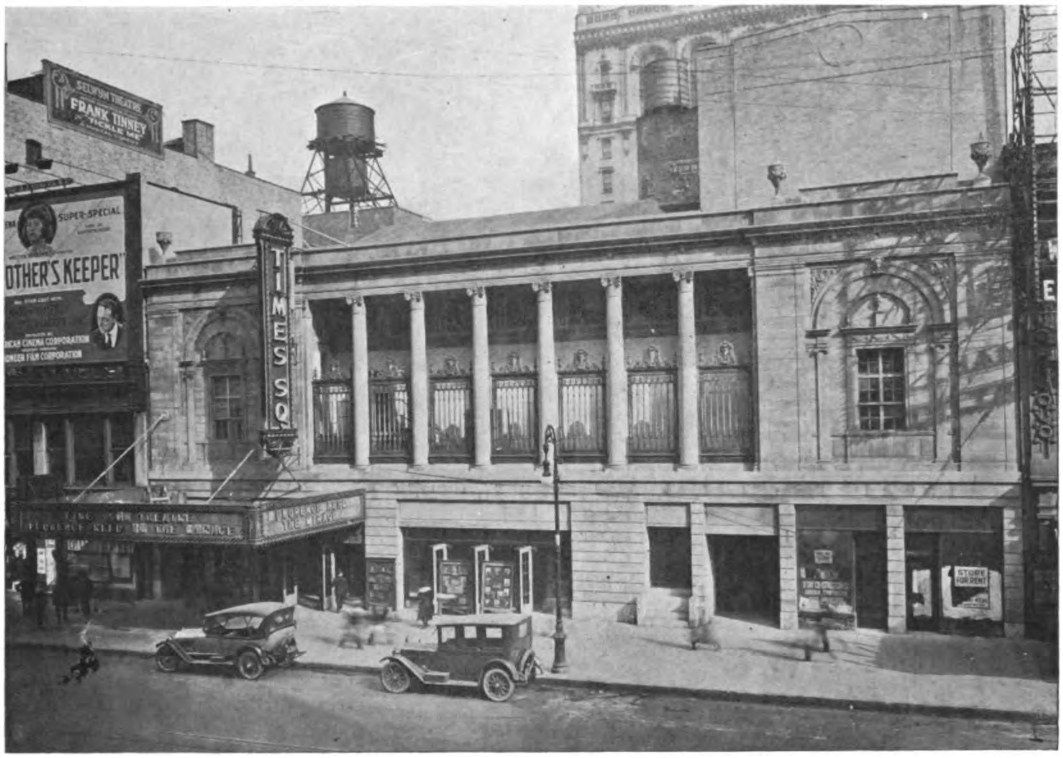

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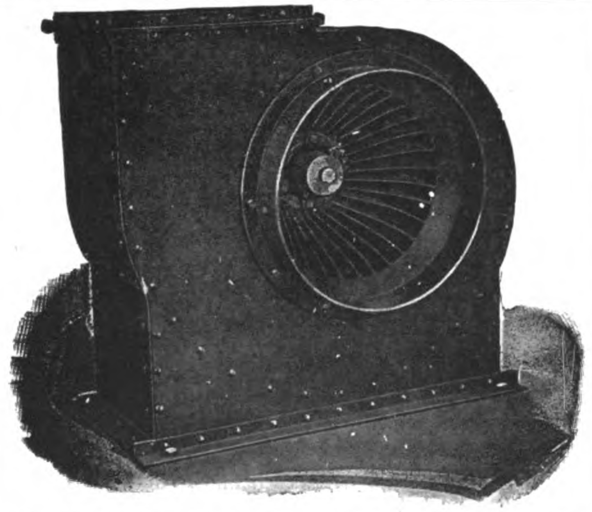

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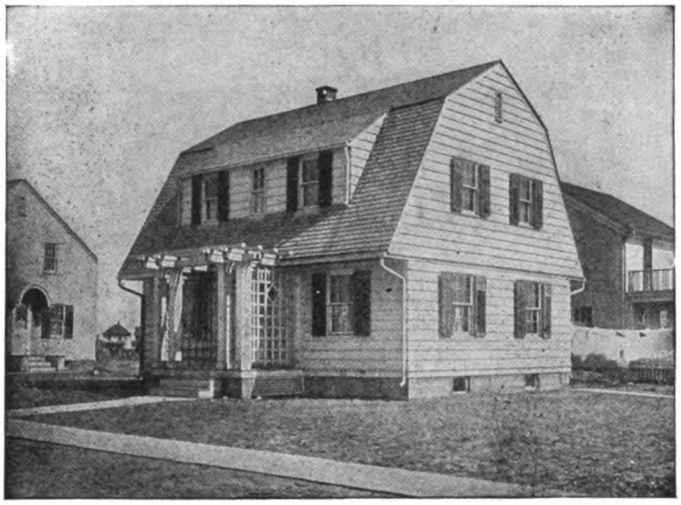

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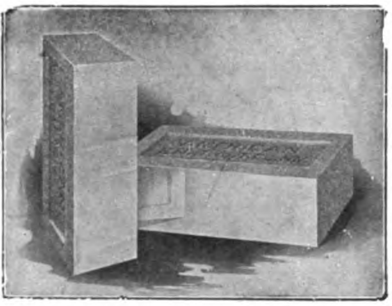

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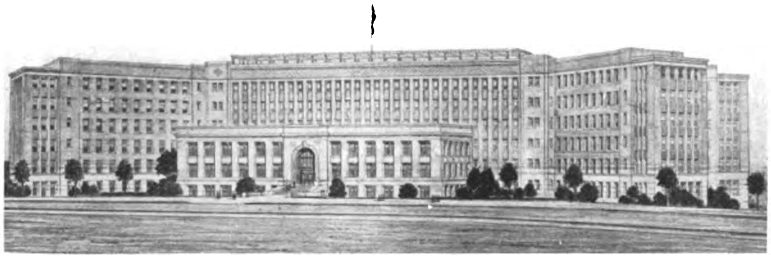

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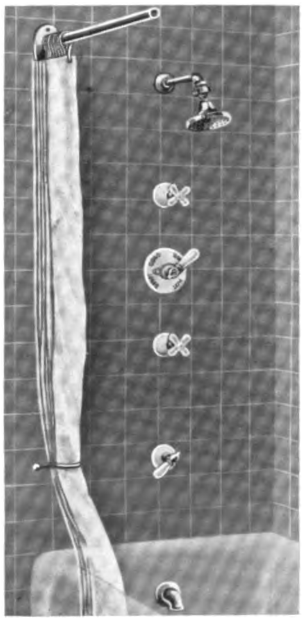

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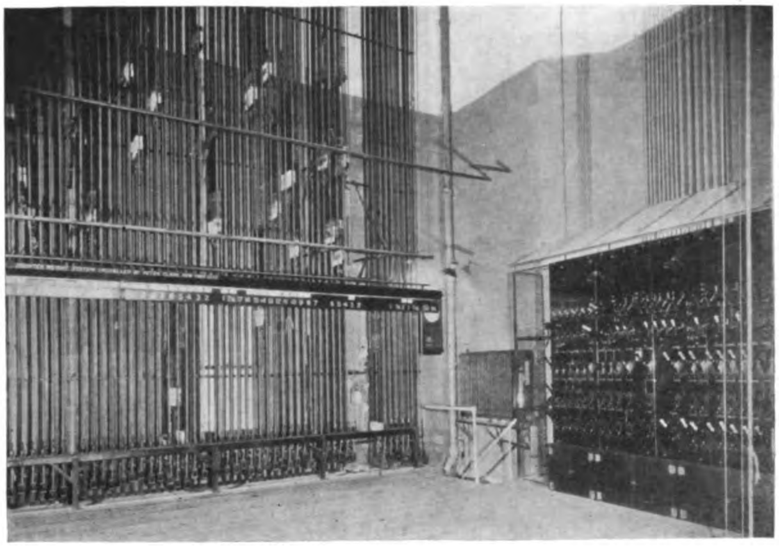

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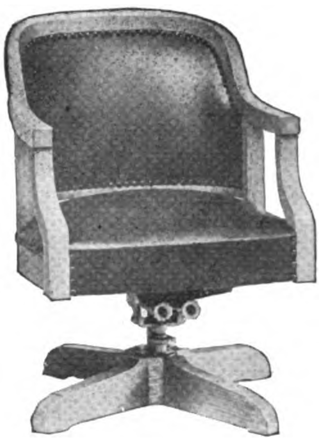

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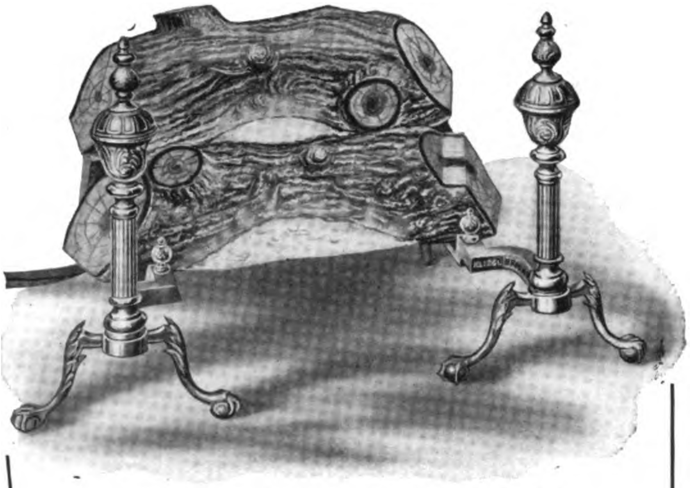

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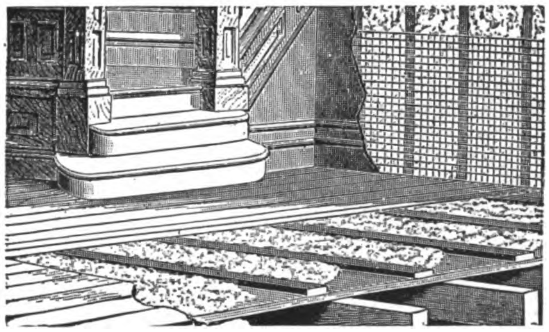

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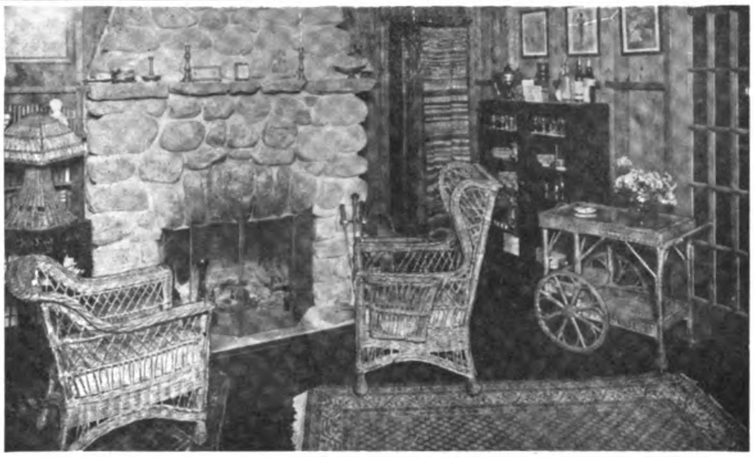

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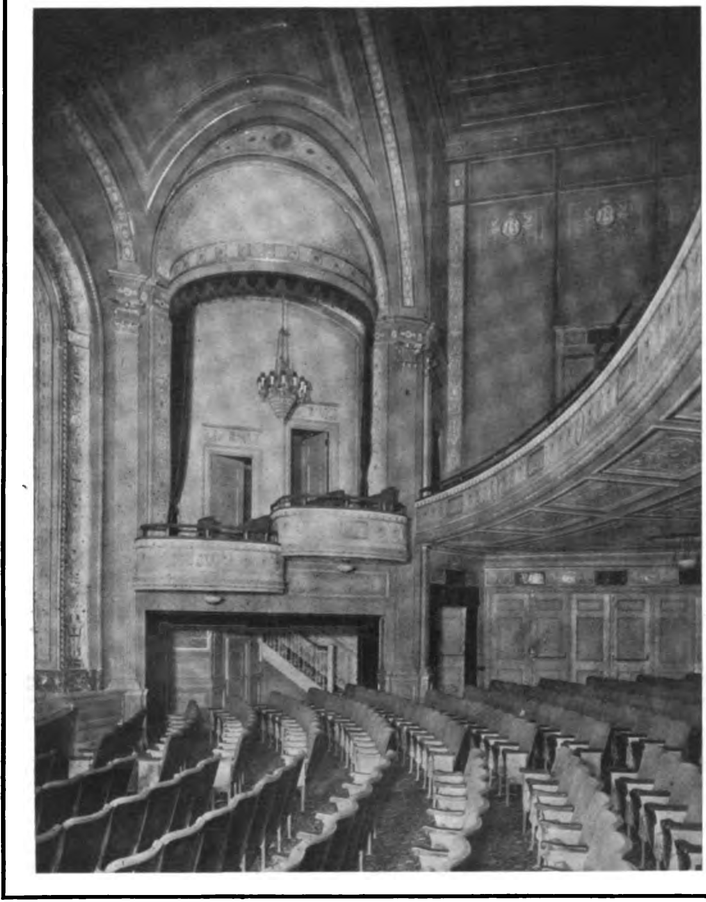

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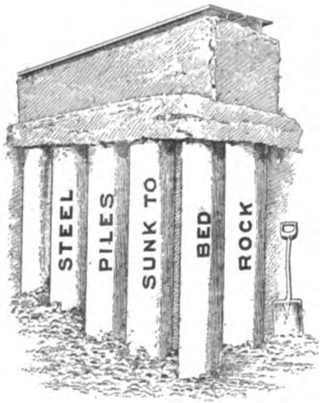

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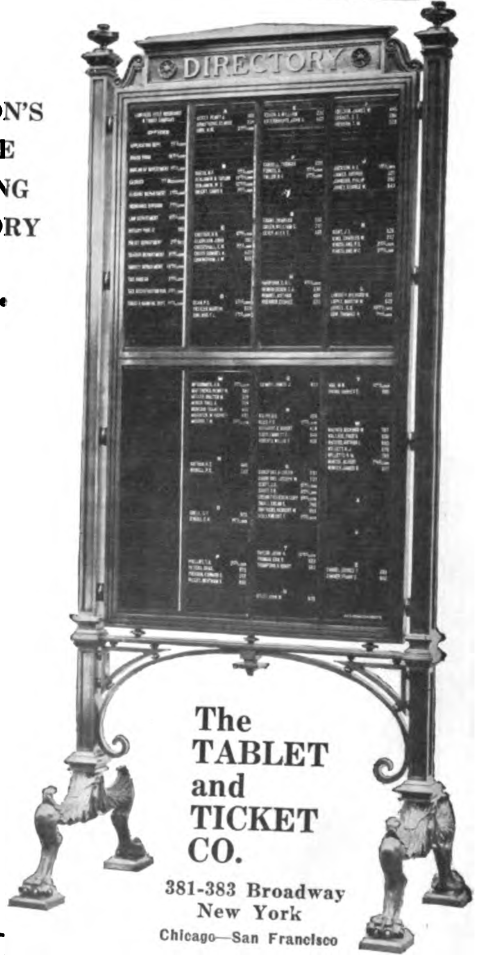

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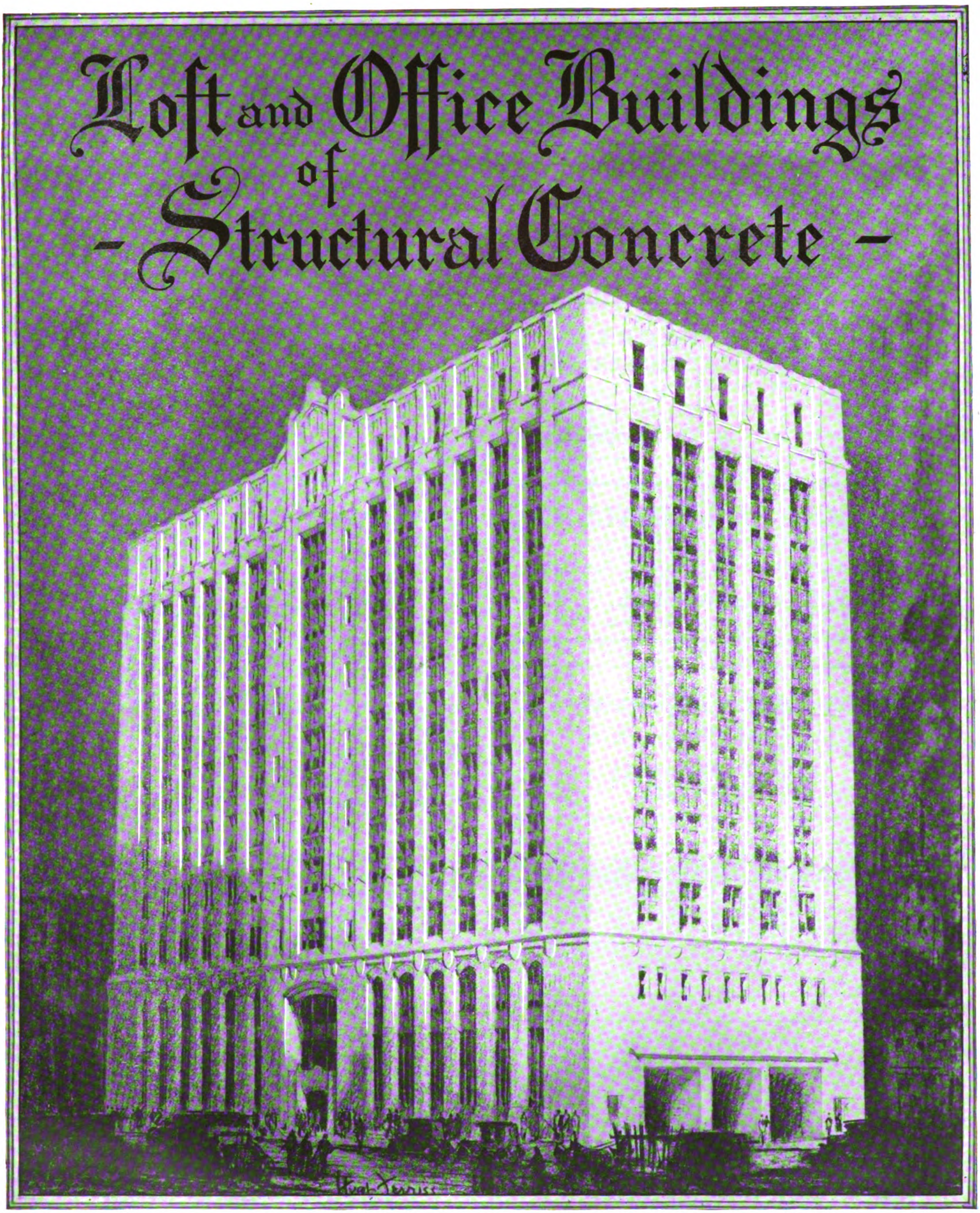

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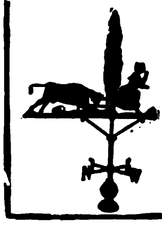

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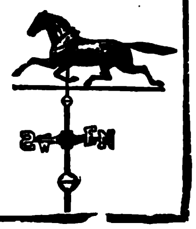

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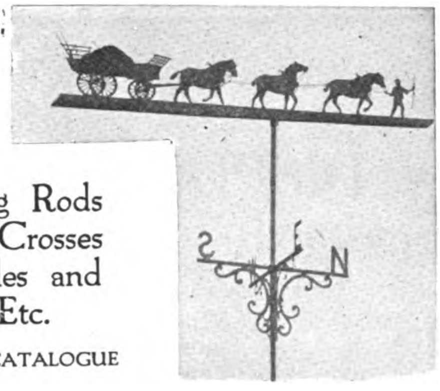

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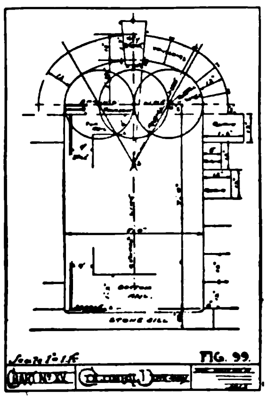

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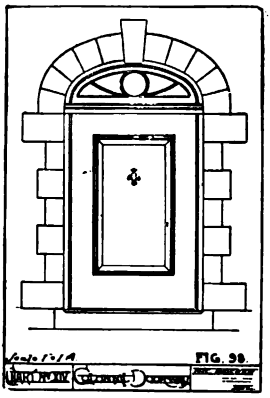

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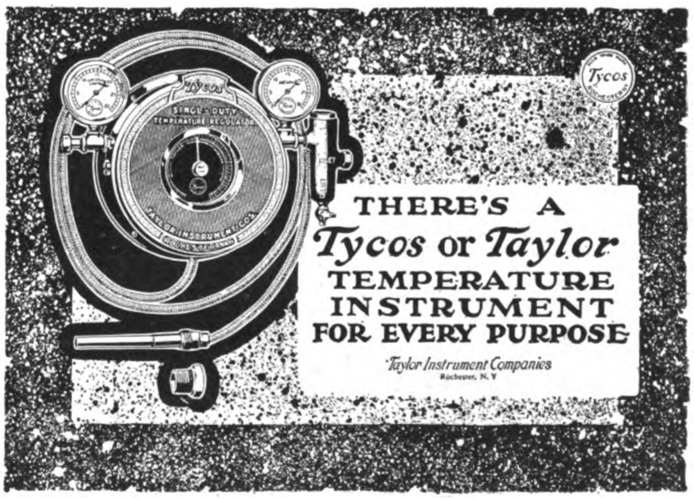

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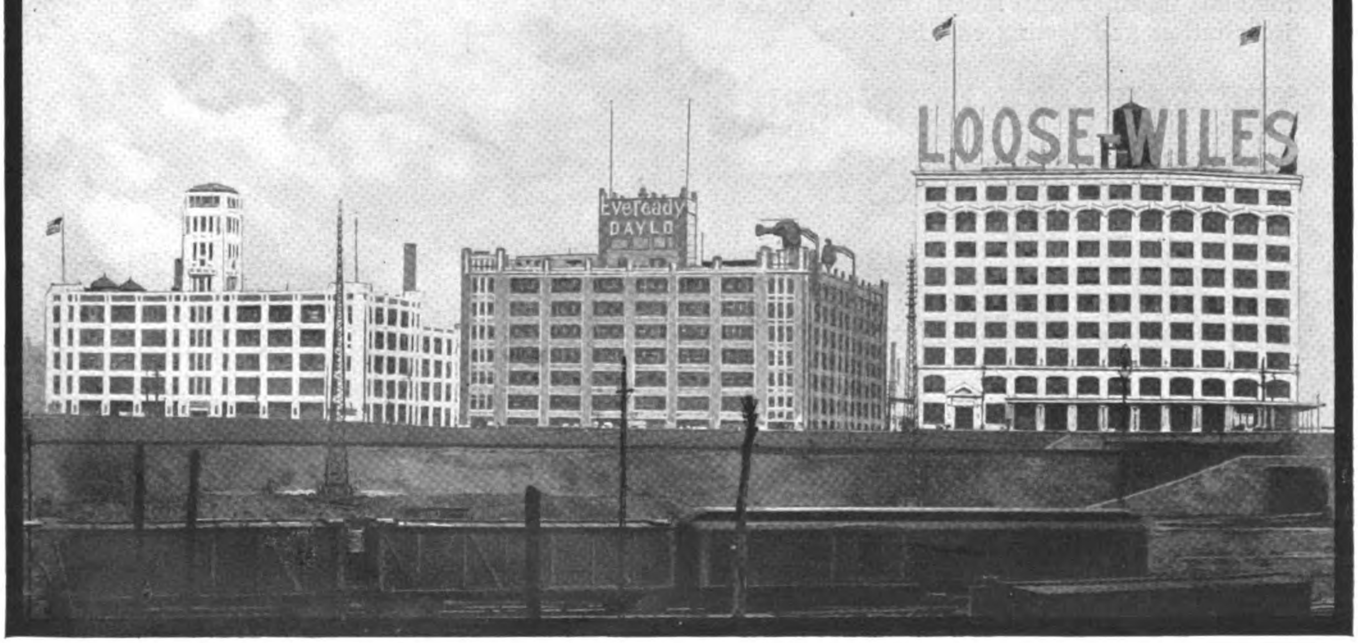

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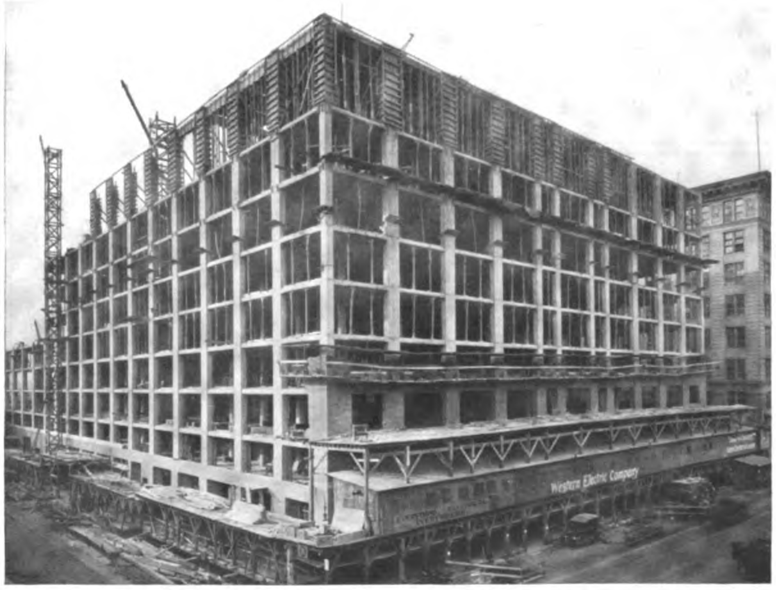

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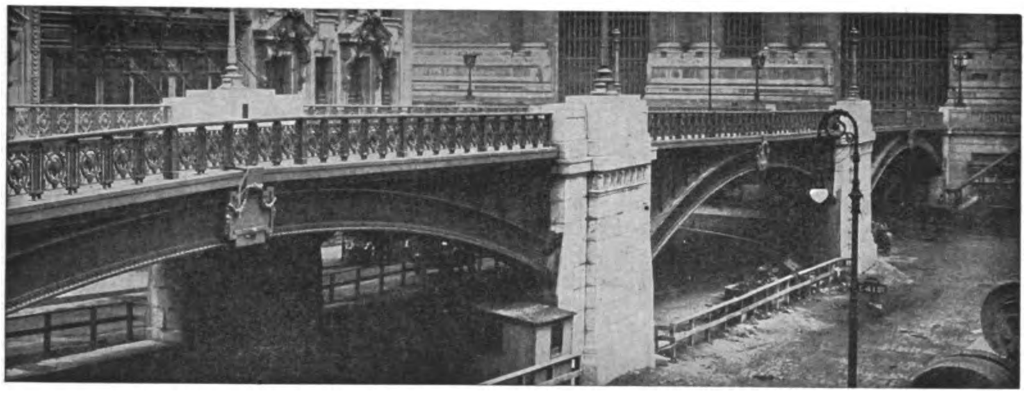

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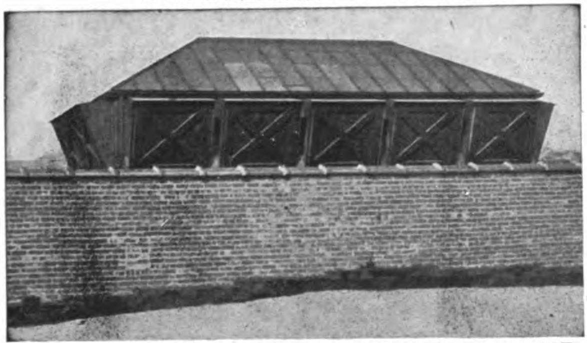

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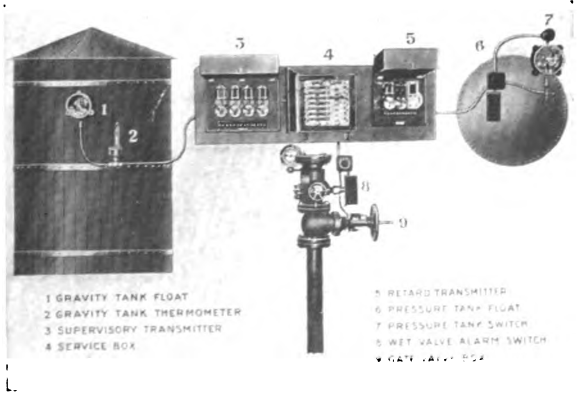

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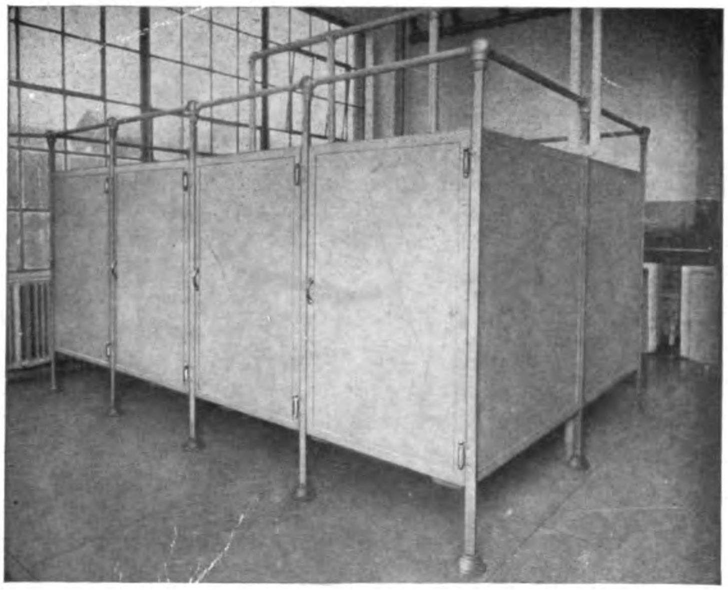

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